FOOD INDUSTRIES

DISTRIBUTION • PROCESSING

McGraw-Hill Publishing Company, Inc.

JANUARY, 1937

Thirty-Five Cents Per Copy

JAN 11 1937

East Engin. Library

ENDURO

Separating Tables

banish

Maintenance Worries!

Leading plants banish high maintenance costs with ENDURO tables and other ENDURO equipment. Completely resistant to all meat products . . . with no surface coating to chip or wear off . . . this perfected stainless steel remains sound and serviceable indefinitely. You should get all the facts on ENDURO. Write Dept. FI.

REPUBLIC STEEL

ENDURO

Reg. U. S. Pat. Off.

REPUBLIC'S PERFECTED STAINLESS STEEL

Licensed under Chemical Foundation Patent No. 1339378. ENDURO is sold only through Republic Sales Offices and Authorized Distributors

Republic Steel CORPORATION

ALLOY STEEL DIVISION, MASSILLON, OHIO

GENERAL OFFICES: CLEVELAND, OHIO

UNIV OF MICH
GENL LIBR
ANN ARBOR MICH

Speaking FOR THE LADIES...

"The home maker appreciates a container that's useful...one that's convenient to open and to close again after the seal is broken."

EDNA VAN HORN
Assistant Editor
Better Homes & Gardens

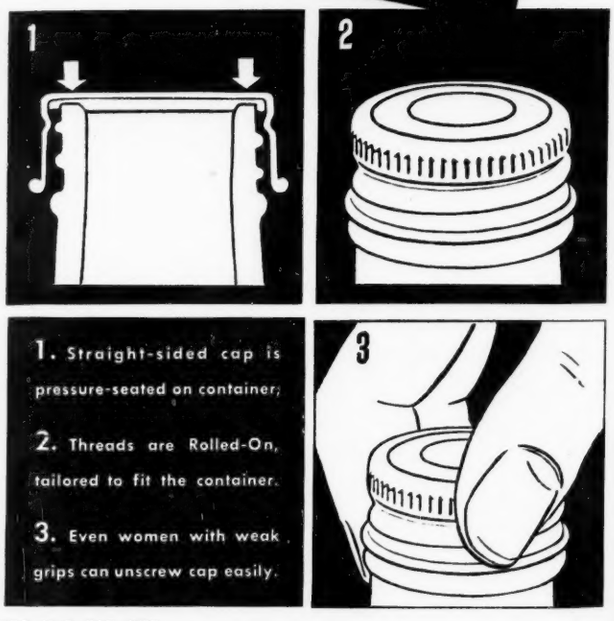
NOTE: This is not a testimonial; just an authoritative statement of fact.

Knowing what 1,400,000 women readers want is Miss Van Horn's job. So, what she says of seals is not to be pooh-poohed by makers of glass-packed products.

No pooh-poohing this, either: the R-O Seal is easier to remove and it's a perfect reclosure. Exhaustive tests of the Pittsburgh Testing Laboratory clearly prove that women can open R-O's more easily than any other screw-type closure. Rolled-On threads account for the difference.

The R-O method of application also assures uniformly tight seals; no leaks or breathers. R-O Seals are commonly used for vacuum packing.

Many other advantages are covered in our book, "Shake Off These Two Dragging Shackles." Write Aluminum Seal Company, Dept. FI-1, New Kensington, Penna.


1
2
3
1. Straight-sided cap is pressure-seated on container;
2. Threads are Rolled-On, tailored to fit the container.
3. Even women with weak grips can unscrew cap easily.

TRADE MARK REG. U. S. PAT. OFF.

Alseco SEALS AND SEALING MACHINES

Contents

for

January, 1937

Volume 9, Number 1

FOOD INDUSTRIES

DISTRIBUTION • PROCESSING

LAURENCE V. BURTON, *Editor*
LOUIS F. STOLL, *Vice-President*
M. A. WILLIAMSON, *Manager*

Editorial Staff:

E. S. STATELER, Associate Editor
G. L. MONTGOMERY, Managing Editor
F. K. LAWLER, Assistant Editor
R. S. McBRIDE, Washington
PAUL WOOTON, Washington
N. A. BOWERS, San Francisco
S. T. HENRY, Spruce Pine, N. C.

EVERY MONTH

Talk of the Industry 1
Comment on things that have happened and those that haven't but should, served up with editorial meringue.

Automotive Section 25
Ways to make better and more economical use of trucks in the distribution of food. Discussions of problems by men who operate fleets.

Everyday Operating Problems . 28
Constructive comments on production and management problems of plant operators.

Answer to Plant Questions 29
How plant operators are solving their problems from day to day.

Plant Notebook 30
Corner cutting methods and devices worked out by plant operators.

Discoveries and Inventions 33
Concentrated information about new methods, processes, patents and research work.

New Equipment 37
New tools of production for the food-plant operator.

Just Off the Press 40
Free catalogs, booklets and leaflets giving information about machines and supplies.

They're After Your Market ... 41
What manufacturers and distributors are doing to increase sales of their products.

New Products and Packages .. 44
What food manufacturers are making and how they are dressing it up for sales.

Business Trends 46
Prices, supplies and markets. This time it is a forecast of raw material supplies for 1937.

Keeping up with the Field 48
Happenings in and out of the industry that affect the future of the field. Briefed for quick reading.

Men, Jobs and Companies 51
News about the people, plants and companies that make up the food industries.

Book Notes 55
Writings on topics of interest and importance to food men.

Patent Digest 56
A service to those who wish to keep posted on all new patents affecting the food industries.

THIS MONTH

Frozen Milk *By R. S. McBride* 4
Milk has been successfully distributed over long distances in a frozen, concentrated, canned form. This may change the market picture for fluid, dry, evaporated and condensed milk.

How Will Consumers Rate Your Product? *By W. Platt* 7
About the first thing every food manufacturer and distributor wants to know about his product is whether it has market possibilities. This article describes how to get the right answer to that question.

What Will the Weather Be *By L. V. Burton* 10
Every food processor and distributor is at the mercy of the weather. It affects markets, consumption and raw material prices and supplies. Perhaps 1937 and 1938 weather will duplicate that of 1914 and 1915. There is a theory that says it will.

What is a Potato Chip *By H. A. Schuette and R. G. Zehnpfennig* 11
Chemical analyses of nine samples reveal the composition of potato chips and indicates that there has been some misunderstanding about the product.

Instant Washing for Quality Control *By Ralph S. Brown* 12
It is possible to can baby lima beans and peas in such a way that they are almost indistinguishable from the "raw" or frozen product. Rapid handling and prompt washing are important factors in obtaining this high quality.

Let the Bakers Make the Cakes *By H. S. Coith* 14
There is something of a lesson for other food manufacturers in the method by which bakers are taking the production of cakes out of the kitchen. Researches on a basic raw material showed the way.

Proving Ground for Packages *By C. A. Southwick, Jr.* 16
Creation of new packages is an important activity of every food manufacturer. This article tells how to determine the suitability of a new packaging material before it is put into service.

$40,337 Saved in Sales Costs *By A. H. Foster* 18
Every food company employing truck routes for distributing its products can use the time-study method by which this saving was made.

Food Plant Engineering at Armour's *By F. A. Lindberg* 20
Sanitation, efficiency and low-maintenance costs are essentials of every well run food plant. Armour has incorporated the latest ideas along these lines in its new beef house.

How Henry Heide, Inc., Promotes Safety *By H. E. Wheeler, Jr.* 22
All food manufacturers want to make their plants safe for workers, for economical as well as humane reasons. Practical accident preventives are being used by this confectioner.

Avoid Contamination in Syrup Handling *By J. M. Scharf* 24
Corrosion-resistant materials are used in almost all food plants. So the construction of pipe lines and valves used by bottlers for handling syrup is of wide interest.

Selling Power of Packages Extended to Truck Bodies 25
Perhaps all food distributors could profit by tying in the design of their packages with that of their truck bodies, as done by Geo. A. Hormel & Co.

Published monthly: price 35c a copy. Subscription rates: United States, Canada, Mexico, and Central and South American countries, $3 a year. All other countries, $5 a year or 20 shillings. Entered as second-class matter Aug. 17, 1936, at the Post Office, Albany, N. Y., under the act of March 3, 1879. Cable address: "McGrawhill, New York." Member of A.B.P. Member of A.B.C. Contents indexed monthly in the Industrial Arts Index.

Copyright, 1936, by McGraw-Hill Publishing Company, Inc.

McGraw-Hill Publishing Company, Inc.

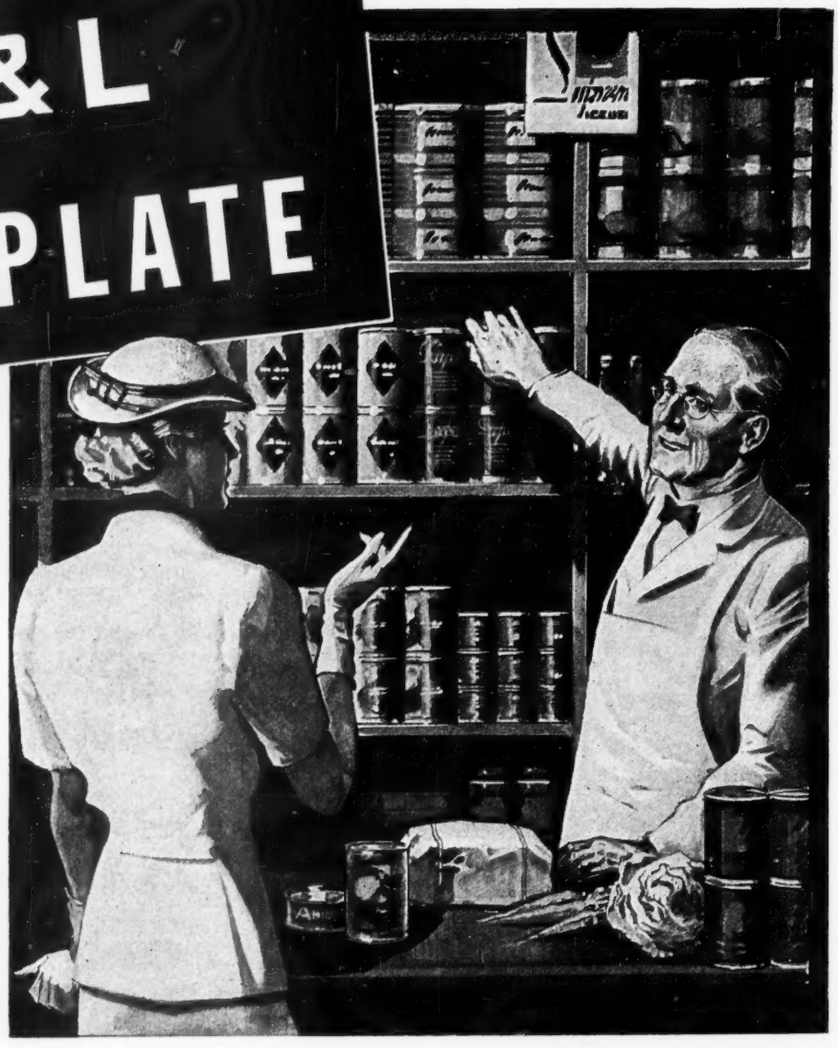
Publication Office: 99-129 North Broadway, Albany, N. Y.
Editorial and Executive Offices: 330 West 42nd St., New York

JAMES H. McGRAW, JR., Chairman
MALCOLM MUIR, President
JAMES H. McGRAW, Honorary Chairman
LOUIS F. STOLL, Vice-President
B. R. PUTNAM, Treasurer
D. C. McGRAW, Secretary

Branch Offices: 520 North Michigan Ave., Chicago; 883 Mission St., San Francisco; Aldwych House, Aldwych, London, W. C. 2; Washington; Philadelphia; Cleveland; Detroit; St. Louis; Boston; Atlanta, Ga.

. . . For Containers and Closures that help sell Your Product . . . depend on

J & L TIN PLATE



No matter what your special requirements may be, you will find that containers and closures of J & L tin plate will give you complete and lasting satisfaction, and their high quality will help sell your product.

The uniform high quality of J & L tin plate which makes possible its excellent performance, is the result of the painstaking care that is devoted to its manufacture.

In the first place, J & L tin plate is made of the highest quality steel, especially selected to meet your own individual requirements. Then, it is carefully manufactured under the strictest metallurgical control. And, finally, it is subjected to a series of critical tests and inspections to make doubly sure that every sheet is of the same uniform high quality.

Hundreds of users specify J & L tin plate because they know they can always depend on it. They know that it is properly annealed, uniformly tinned, thoroughly cleaned, has a uniformly fine grain and a smooth clean surface.

You, too, will be sure of containers and closures of superior quality, if you specify J & L tin plate.

JALCOLD

Jalcold is a cold-reduced special purpose plate with increased ductility and exceptional capacity for deep drawing operations. Its fine lithographing quality, its flatness and uniformity to gauge make it ideal for many types of containers and closures.

OTHER J&L PRODUCTS

Seamless and Welded Pipe . . . Seamless Steel Boiler Tubes . . . Structural Shapes, including Lightweight Channels and Junior Beams . . . Concrete Reinforcing Bars . . . Nails and Wire Products . . . Fabricated Structural Work for Construction and Maintenance

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION
AMERICAN IRON AND STEEL WORKS
JONES & LAUGHLIN BUILDING, PITTSBURGH, PENNSYLVANIA

Sales Offices: Atlanta Boston Buffalo Chicago Cincinnati Cleveland Dallas Denver Detroit Erie Houston Los Angeles Memphis Milwaukee Minneapolis New Orleans New York Philadelphia Pittsburgh Seattle St. Louis San Francisco Tulsa
Warehouses: CHICAGO CINCINNATI DETROIT MEMPHIS NEW ORLEANS NEW YORK (Long Island City)* PITTSBURGH
* Operated by National Bridge Works Division of Jones & Laughlin Steel Service, Inc.
Canadian Representatives: JONES & LAUGHLIN STEEL PRODUCTS COMPANY, Pittsburgh, Pa., U. S. A., and Toronto, Ont., Canada

FOOD INDUSTRIES

DISTRIBUTION • PROCESSING

Established 1928—McGraw-Hill Publishing Company, Inc.

Vol. 9, No. 1

Laurence V. Burton, Editor

•

JANUARY 1937

The Talk of the Industry

» PATIENCE, it has been said, is always rewarded. But in this case we are tired of waiting for someone to suggest that the American Molasses Co. should put out a new brand of molasses for candy pulling. The name, of course, will be Tugwell Brand.

» TO SENATOR ROYAL F. COPELAND goes our unqualified admiration for his ability to discuss the pending Food and Drug Law revision in public addresses without spilling the beans, not even a single one. An expectant audience on two recent occasions departed equally expectant and not very much wiser. It's a gift.

» GENERAL HUGH S. JOHNSON, late of NRA, pans business one day in the true crack-down fashion. And a couple of days later he backs water vigorously in these words, ". . . . when this column meant 'white' with emphasis, enthusiasm and conviction, the words said 'black'."

Ho hum.

» A MOST remarkable discovery was announced by the AAA a short time ago. It said that food prices continued to keep pace with the earnings of employed factory workers.

In our own amateurish way, we should regard it as remarkable if food prices ever deviated noticeably from them.

» BUSINESS OF AWARDING the FOOD INDUSTRIES' *Croix de Goo,* with palm, to Mr. Percy S. Brown for the best wisecrack of the month. Speaking on Consumer Cooperatives before the American Management Association, on Nov. 12, 1936, he said,

"The conventional department store . . . is neither scientifically organized nor efficiently operated. As a result, the margin of return on sales is very much greater than, for example, in the field of retail food stores."

» THOSE who are overweight may derive a certain amount of satisfaction from recently published remarks by Dr. Milton A. Bridges of Columbia University. And we hope that advertising copywriters, as well

as food manufacturers who employ them, will take notice.

He says, sezzee, "It has never been recognized that nature or man has been able to purchase any such thing as a reducing food. There does not exist any fruit, vegetable, meat, fish or any other food which in itself is capable of reducing physical weight as much as one-thousandth of a pound."

Some recent advertising copy reminds one of the girl in Chicago, way back in 1917, when sugar cost about 20 cents per pound. She gave an old fashioned candy-pull party to show her guests how to save sugar.

» WHEN OL' DOC TUGWELL decided to re-enter the food business in November, only the necessity of rigid adherence to contract schedule with our printers prevented timely comment on the event. His change of job is called re-entrance because, you see, he once had charge of the retort room in his Pa's canning factory. And gossip around Modeltown, N. Y., has it that he could bust the seams and buckle No. 10 cans at an astonishing rate.

Now that he is one of us and, *of course,* no longer against us, every right-thinking man in the food industry will welcome him warmly into our fraternity.

» MRS. MARJORIE POST DAVIES is going to Moscow with her husband, Joseph E. Davies, the new ambassador to the U.S.S.R. You may recall that her father founded the old Postum Cereal Co., now a part of General Foods. She is now a director in the company.

In preparation for the rigors of residence in Moscow, the Davies' are sending over 25 mechanical refrigerators, some of which are freezer

cabinets, and 2,000 pints of Birdseye Frozen Cream from the Walker-Gordon Dairies. The newspapers don't say that they are taking other frozen foods, but there is a strong suspicion that frozen cream is not the only reason for the freezer cabinets.

It sort of looks as if some of the Soviet comrades are going to be exposed to what they call *bourgeoisie* living.

Resale Price Control

ONCE AGAIN the Supreme Court of the United States has ruled on a matter of great importance to food manufacturers. The Illinois Fair Trade Act, which permits sales contracts to fix the resale prices of branded merchandise, has been sustained.

Without going into the ramifications of this decision, it is well to note that as in the N.R.A. decision, the Supreme Court "is not concerned with wisdom but with power." Since resale price maintenance on branded items now seems to be constitutional under all state laws conforming to the decision, the problem of wisdom remains unsolved.

As the contest between private and manufacturers brands proceeds, this decision can easily prove to be a dangerous device in the hands of the unwise. Freedom from restraint on resale policies has its problems but it also has the benefit that resale prices cannot be placed too high. The dealers will take care of that.

But now that manufacturers can contract to sell branded merchandise under resale price agreements, where state laws will permit, it puts the burden of wisdom on the manufacturer. If prices are too high, the private brands walk in under the price umbrella. If resale prices are low enough the manufacturer cannot make as much money on the unit of sale, but the private brand is deprived of a decisive price advantage.

It behooves sales management to keep resale prices as low as possible unless they are willing to hold the umbrella over private brands.

The Consumer Angle To The Fore in N.A.M.

THE TWELVE-POINT PROGRAM, printed elsewhere on these pages, was laid before the National Association of Manufacturers on Dec. 9 by its president, Colby M. Chester, chairman of General Foods. It deserves careful study and commendation.

Ever since Nov. 3, 1936, the heads of most businesses have been studiously inquiring into the real significance of the election. And, regarding it as a sort of consumer survey, they have acted.

Certain very liberal newspapers have been frankly astonished at the way business can adapt itself. Business has a way of doing just that. The business man who cannot face the facts does not last very long.

But adaptation to a very evident form of public opinion does not in any way detract from the progressiveness of the twelve-point program. N.A.M. has been very fortunate in having a man like Mr. Chester at its head. And it is to be hoped that this type of leadership will continue in the future.

Public Debt

DEBT in the United States, federal, state and municipal, on a per capita basis was $416 on June 30, 1936. In the United Kingdom at the end of 1935 the per capita debt was roughly $1,016. Let us fervently hope that our own debt will not get very much higher.

Why Not "Plan" Our Depressions?

FAR BE IT from this department to boast. Yet, if the National Association of Manufacturers really wants some one to tell them what caused the depression and what will have to be done to prevent another set back, we might, for a suitable large consideration, be persuaded to impart this valuable information.

Hors d'Oeuvres

• If you wonder what the Patman Act has done for business, take a look at these unidentified comments gathered by the AGMA survey: Manufacturer—"We are now able to practice good business without being queer in the eyes of the buyer." Distributor—"We have received checks from several manufacturers for rebates which we never knew existed." Another distributor—"We have been cheated out of $1,000 a month in advertising allowances which we never earned."

• *We've often wondered about the theory back of ads picturing a beautiful girl lying semi-clad on a couch with a large box of candy near her. This is explained in the Dec. 3 issue of* Advertising and Selling, *from which we quote. "The theory is to arouse romantic interest in male readers, with a transfer or carry-over to the candy, and the conclusion that a piece of it wouldn't be so bad either."*

• A pure form of vitamin D has been produced which is worth four times its weight in gold. But don't tell anyone in Washington. They might put the country on a cod-liver standard, and the 59-cent dollar is fishy enough.

• *Electrodes placed in the river in proper relation to a fish trap will shock electric eels and cause them to turn aside into the trap, it has been discovered in Northern Ireland. The irony of being conquered with one's own weapon!*

• While putting the pinch on Ethiopia, Italy apparently lost a $5,000,000 market in the United States. Packers in Stockton, Calif., discovered that the pear-shaped Italian tomatoes used in tomato paste will grow better in the San Joaquin Valley than in Italy.

• *Since the people west of Maine and South of Vermont renewed the New Deal, it has become fashionable to do something for workers. So here's a suggestion for food manufacturers. Give the help morning and afternoon recesses and encourage them to eat between meals. That will improve man-hour efficiency, boost food consumption and make the workers happy.*

• Meat from cattle exercised on a treadmill by Professor Sleeter Bull, University of Illinois, was found more tender than that from unexercised animals. More muscle cells were formed without an increase in connective tissue, is the explanation. Maybe the packers ought to put treadmills in the stockyards, generate power for Chicago and produce tender beef for the rest of the country.

• *We U.S. Americans eat about one-fourth of all the meat consumed in the world. Perhaps if more of it were fed to our friends beyond the water they wouldn't be forever stalking prey across their borders.*

Mind you, the foregoing paragraph is not an offer to tell *how* to prevent another depression. Frankly we don't know how anyone can carry out the things that will have to be done to prevent a recurrence of hard times. Not as long as men are men who hope, and dare, and work, and loaf, and fight, and plot, and invent and die. Not as long as weather and climate and cosmic forces are uncontrollable. Not as long as two different opinions can be reached by different men from exactly the same set of facts.

There is ample room for optimism, however. In our amateurish way of planning the affairs of the universe why not plan our depressions? For centuries we have had a splendid example of planned depressions that everybody enjoys. Why not extend the idea that works so well on a small scale?

What is this small scale depression? Well, most of us call it Sunday. It is a period of terrific unemployment. Business is dead. In many places it is against the law to work or open a store or factory.

Nobody knows how to plan successfully for good times, but we have countless years of experience in planning a very pleasant weekly depression. And we enjoy it because we know when it is coming and are ready for it.

A Creed For Industry Today

THE following twelve basic proposals were urged upon the National Association of Manufacturers in the keynote speech of its president, Colby M. Chester, chairman of General Foods Corporation.

1—Industry must accept its responsibility for the national welfare as being an even higher duty than the successful operation of private business.

2—Industry must continue to fulfill its obligations to the public in making better goods at lower cost, thus raising the standard of living and keeping the door of personal opportunity open.

3—Put every possible employable in manufacturing industry back to work.

4—Keep its own house in order, exposing its policies at all times to public scrutiny.

5—Stand four-square against monopoly.

6—By its actions engender growing confidence on the part of workers.

7—Invite increasing public understanding of industry by telling the facts.

8—See that workers, management and investors, according to their contribution, share fairly in the proceeds of manufacturing.

9—Help to create economic security for all, preserving as well the opportunity for the individual to attain his own greater security.

10—Zealously live up to its responsibilities and insist that all other factors of our economic life, including labor organizations, be made equally responsible.

11—Make its cooperation available to government in a constructive manner at all times.

12—Join other business groups in studying the depression in order to minimize or avoid another one.

Chiseling the Other Fellow's Labor

IN A RECENT PUBLIC GATHERING on industrial relations, a speaker emphasized that labor is no longer to be classed as a commodity, saying that manufacturers cannot and must not chisel labor's wages as though they were buying boxes, cartons, supplies, machinery or materials.

With such an expression of policy, we believe most manufacturers will not disagree. Industry now seems to be pretty well sold on the principle of wages just as high as possible without pricing its products clear out of the market.

But why, oh why, is it right to chisel the other fellow's labor, if it is wrong to chisel on one's own? If industry is to pay high wages all around, does it not mean that the purchaser of supplies must also allow his suppliers to pay high wages? If the answer to this question is "yes," it seems to us that the next important progressive step is to overhaul existing industrial buying practices.

A University Course In Food Technology

THE FIRST UNIVERSITY COURSE in Food Engineering in the United States has been started at Massachusetts Institute of Technology, Cambridge, Mass. It is called Food Technology and is a four-year course. To see this recognition of the essential unity of the food industries is naturally gratifying to FOOD INDUSTRIES.

Other educational institutions in the country have courses in special subjects, such as dairy manufacturing, canning, flour milling, meat packing, sugar technology and the like where emphasis is on the technology of a given food. At M.I.T., however, the training of the future food engineer is based on a thorough grounding in principles and methods that are fundamental to all forms of food manufacture.

Other universities should give thought to developing such courses. The food manufacturing industries offer a huge potential, though undeveloped, market for well trained men.

Bulk Packaging Conference

AT THE 1937 packaging conference and exposition it is planned to have a session on bulk packages. These are the bags, drums, barrels, tank cars and carboys. We are helping to plan the program to be held next March.

Readers of FOOD INDUSTRIES are requested to send in subjects or problems about which they want further information, or which they would like to hear discussed at the meetings. Questions pertaining to any aspect of bulk packaging are sought. Please address them to the Editor.

FROZEN MILK...

May Change Existing Marketing Methods

By R. S. McBRIDE
Editorial Representative, Food Industries, Washington, D. C.

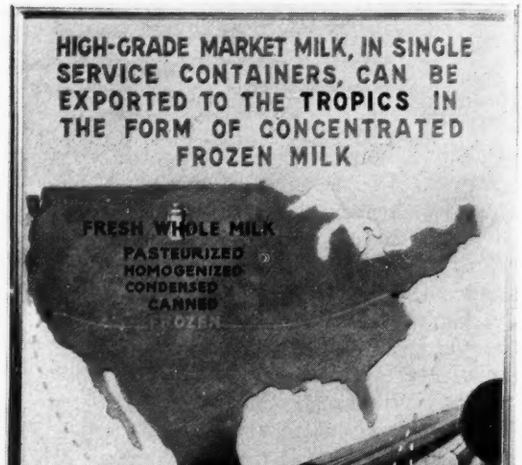

HIGH-GRADE MARKET MILK, IN SINGLE SERVICE CONTAINERS, CAN BE EXPORTED TO THE TROPICS IN THE FORM OF CONCENTRATED FROZEN MILK
FRESH WHOLE MILK
PASTEURIZED
HOMOGENIZED
CONDENSED
CANNED
FROZEN
COLD STORAGE HELD FROZEN UNTIL DELIVERED

Exhibit of the Bureau of Dairy Industry Dairy Industries Exposition, Atlantic City, N. J., Oct. 12 to 17, 1936.

DOUBLE STRENGTH or triple strength milk frozen in the can is a technically practical dairy product. This seems to be proved conclusively by the small scale experiments of the United States Bureau of Dairy Industry. And this product offers very interesting possibilities of commercial development which may make real money for different divisions of the food industries.

The accompanying flow diagram pictures the interrelation of unit operations which would be required for commercialization of this work. None of the operations is individually unusual, only the combination is novel. And there is no engineering reason why the combination will not work in the hands of any skilled food engineer. The real problem is the matter of economics in marketing. But to understand those economics, one should first consider the methods involved and the character of the product.

FRESH whole milk at the creamery is pasteurized and then condensed to one half or one third of its initial volume. It is then homogenized and packaged; or it may be homogenized before evaporation. In the semi-works experiments of the Bureau the operation has been essentially that which one would expect in an evaporated milk plant. The difference in treatment begins only after the concentrated milk has been sealed in the enamel lined tin cans. But the product is not sterilized by heat.

The canned concentrate for the new process is immediately cooled after leaving the can-closing machine. An alternate plan is to cool the concentrate before canning. Since protection against contamination from equipment and exposure to air is important, the former procedure would seem to be the better. Then the contents are frozen in a cold room. Apparently four to six hours freezing time is permissible.

Contrary to the belief of some persons, quick freezing by direct brine contact with the containers is not necessary to avoid breaking of the emulsion. The frozen product must be maintained at reasonably constant low temperature, preferably around 0 deg. F. Lower temperature might be advantageous in the keeping quality, but appears of doubtful economic advantage.

Numerous tests by the Bureau prove that the product may be preserved effectively for a few weeks in this condition. When desired for use it is thawed in the original container, preferably slowly, and the container opened. Usually it will be diluted with water to bring the contents back to the original milk volume; the result is then an acceptable whole milk of natural fresh flavor and character. The product closely resembles pasteurized milk, but does not have flavor, color, or curd character typical of canned evaporated milk which has been sterilized in the tin.

The time during which the milk can be kept sweet, and the character of the spoiling ultimately experienced, depend upon a number of important factors. The concentrated milk is like pasteurized milk in keeping characteristics. It is not sterile. Therefore, the time before souring depends largely on temperature. But, when frozen, bacterial changes will not occur within a period limited by other particulars.

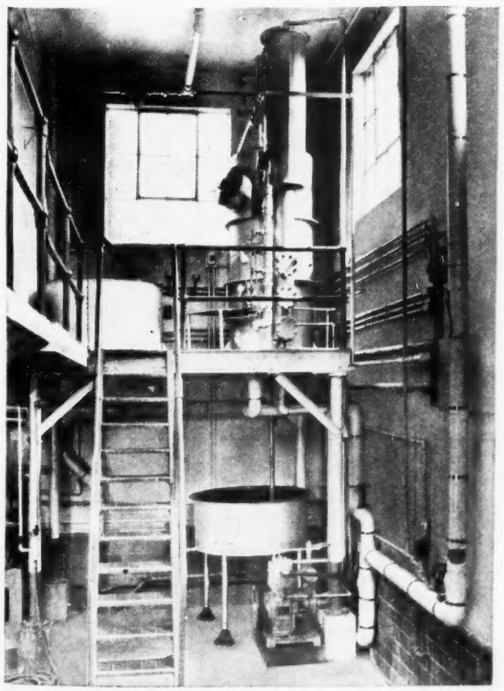
Spoilage will usually be indicated either by fat separation on thawing or by thickening or gel formation from the protein. Off flavors, which are described as "oxidized" or "chalky," usually accompany the thickening process. If the milk is properly homogenized, either before or after the evaporation, fat separation should not occur. Apparently there is no serious difficulty with this characteristic even though the temperature of frozen storage is not maintained absolutely constant. In storage temperature, therefore, milk is easier to handle than quick-frozen fish, berries, or vegetables.

In commercial operation, the limiting factor of keeping quality will be the time before the protein content thickens or forms a gel. This phe-

nomenon, not well understood scientifically, represents a conversion of the suspended colloidal protein content into floc or solid form. In the extreme case the whole can of milk may be jelly-like when opened if kept too long under conditions permitting this reaction.

The time before gel formation depends on the concentration, too great a concentration causing early thickening. Storage at too high a temperature also accelerates this form of depreciation. Present experimental data on a moderate scale indicate that double-normal or triple-normal milk concentration will be chosen according to whether five-week or three-week deliveries represent the longest time interval regularly expected in service. In general it appears that storage from 0 deg. to 15 deg. F. will be most economic.

Experiments in production of the new product have been carried on in a small plant erected by the Bureau of Dairy Industry at its Beltsville, Md., creamery. Only a few precautions beyond those ordinarily observed in evaporated milk practice have yet been recognized. Perhaps most important of the precautions noted is the fact that copper equipment cannot be used for evaporation. Stainless steel or glass lined equipment is necessary for preserving the natural flavor. An enameled can is apparently advantageous. And it appears likely that more than average precautions will be desirable in can washing and filling, as compared with evaporated milk practice. Since the new product is not to be sterilized immediately after the cans are filled, a closer attention to the cleanliness and sterile condition of the cans is desirable.



Condensing unit installed in the small size experimental plant for producing frozen concentrated milk. This plant was erected by the Bureau of Dairy Industry in the U.S. Department of Agriculture dairy at Beltsville, Md.

▶ Milk supply in regions far from the dairying areas depends mostly upon dry milk, evaporated milk and condensed milk. Test shipments of the new frozen concentrated milk indicate that a product having fresh milk characteristics can be supplied to distant points. And the cost should not be more than 2 or 3 cents, per equivalent quart of fresh milk, over the cost of canned evaporated milk. The marketing possibilities of this new product may influence producers of

Fluid Milk

Dry Milk

Evaporated Milk

Condensed Milk

It is desirable that evaporation will be carried out at as low a temperature as feasible, generally at about 130 deg. F.; but economic considerations will, of course, govern the decision as to whether 26 in., 28 in., or a higher vacuum will be carried on the pan. Likewise, prevailing plant conditions will determine the most economic temperature for canning, whether at evaporator discharge temperature or lower. Cans will be filled with not less than $\frac{1}{4}$ in. head space, to allow expansion space needed on freezing.

Single trip containers, usually tin cans, would probably be used for most services. The size of the unit would vary according to the class of customer, from one-third quart for household use (equivalent to a quart of whole milk) up to larger tins of perhaps No. 10 size. For institutional use a standard 10-gal. milk can would perhaps be more economical if freezing were carried out so as to avoid splitting the cans.

Obviously all of the technical operations involved in the processing of the milk, its canning, freezing, storage, and transportation are quite simple. Any evaporated milk plant has all the processing facilities; and the freezing and frozen milk storage units are common in other divisions of the food business. Those experienced in dairy practice can probably estimate within a small fraction of a cent what it will cost for each unit operation and for the storage and refrigerated transportation. These costs may vary widely; they will surely depend on time, distance, season and magnitude of operation. The total of such costs is, in estimate, attractively small in view of certain market possibilities. As samples of these possibilities one may well consider the following examples.

Most attractive market possibilities are expected in areas where dairy cattle are not common, and hence fluid milk is high in price. First experiments at the Bureau in long distance transportation have been made in cooperation with agencies in the Panama Canal Zone, an area where 18 to 20 cents per quart is a common price. It has been conclusively demonstrated that milk properly prepared and chilled will reach the consumer under refrigerated ship transport in a satisfactory condition that far from Washington.

EXACT COST ESTIMATES have not been made, but the Bureau officials have preliminary figures which indicate that delivery at such distant points will be not over 2 to 3 cents per equivalent quart of fresh milk over and above the cost for ordinary tinned evaporated milk, assuming all conditions alike, including the cost of raw milk. Other Caribbean and insular destinations also seem promising. Obviously, more effective results can be had only by full cooperation between producing dairy products companies and shipping lines having refrigerated facilities.

Using the Canal Zone as a distributing base it has been suggested that extensive ships' service might be undertaken. Especially the passenger vessels passing through the Canal would, it appears, welcome reason-

ably priced fresh milk equivalent. Other ship supplies would be merchandised advantageously from New York, San Francisco, and other larger ports of departure for passenger vessels. Proponents of this idea must, of course, assume that a ship receiving such stores would have low temperature refrigeration available effectively to maintain the concentrated milk in frozen condition until time of use. Storage on ship board near the freezing point would probably not be satisfactory, especially if there were a chance for thawing of the milk to commence before practically the time for use.

INSTITUTIONAL MARKETS may also be considered. One idea of this sort would serve the institutional market with frozen milk as a sort of balance wheel on any local milk shed. Institutions cooperating would receive fluid milk when this is in generous supply or frozen concentrated milk during periods of fluid milk shortage. Suitable price concessions would be made by the producers for the resulting benefit in stabilizing demand.

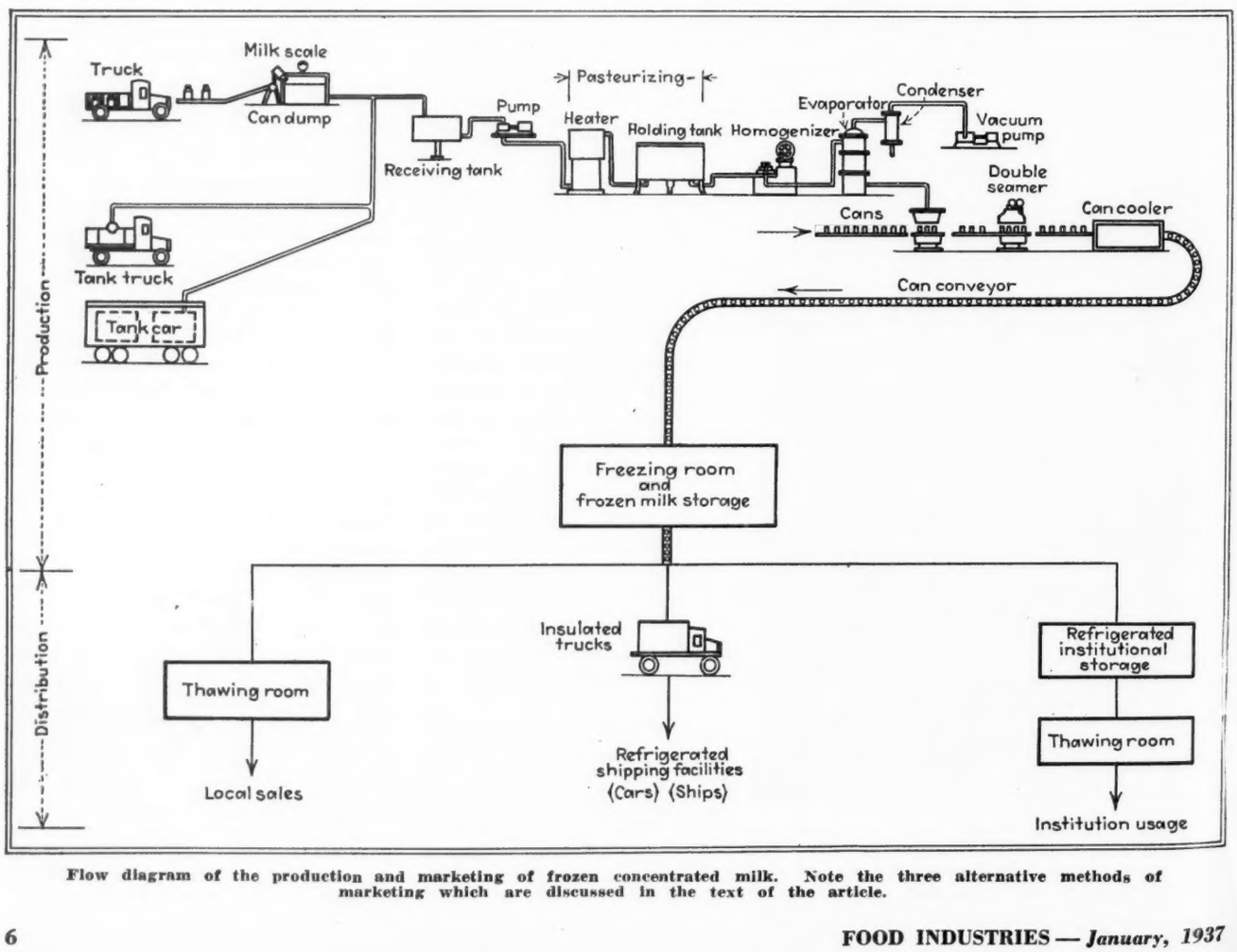
A general market for household trade in centers near dairy areas seems less promising. There a concentrated milk may be economic, but there seems to be no need for freezing in view of the short delivery times attainable. The housewife is not expected to welcome any type of frozen milk supply unless there be a large price advantage for it, in view of the fact that in the household refrigerator it will store no better than ordinary pasteurized milk. It has none of the advantages of long pantry storage which are so welcomed for evaporated and condensed milk. But this concentrate does have the very important household advantage in use that it is free from those modifications of odor, flavor, and color which make evaporated milk less welcome than fresh milk at many tables.

In any household application it should be understood that frozen concentrated milk after thawing cannot be set aside to allow the cream to rise. Hence topping of the milk bottle to get coffee cream is not feasible. But even within these obvious limits the new material may still find welcome in households where the price differential can be high because milk on the hoof is scarce.

In the field of special applications of milk, as for ice cream making, there do not appear to be any significant advantages for frozen concentrate. Those wishing to store for later ice cream use will obviously find dry skim milk and frozen cream better than frozen concentrate. Nevertheless this new product may still have its part in stabilizing the whole milk trade, by introducing a new type of operating flexibility. Both executives and large users will, therefore, inspect these possibilities critically, and perhaps with profit.

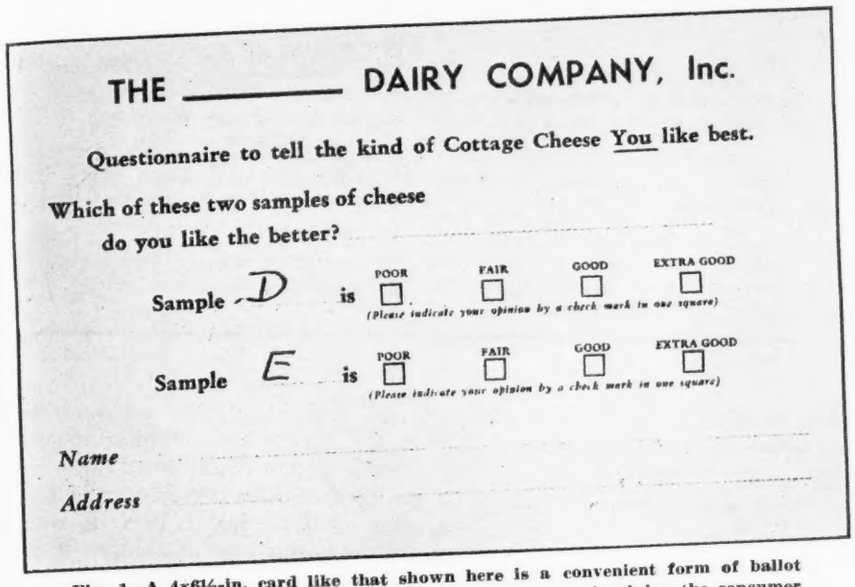
Acknowledgment

The first scientific presentation of the work herein described was made by B. H. Webb and S. A. Hall, before American Dairy Science Association in June of 1934, followed by printing in the JOURNAL OF DAIRY SCIENCE, *May 1935. A patent for the process, dedicated to public use without royalty, has been granted under No. 1,964,279 to B. H. Webb. Semiworks-scale development and contact with industrial groups potentially interested in this work has been continued for the Bureau under the direction of R. W. Bell.* FOOD INDUSTRIES *is glad to make acknowledgment of the cooperation and assistance of these gentlemen in the preparation of the present article*



Flow diagram of the production and marketing of frozen concentrated milk. Note the three alternative methods of marketing which are discussed in the text of the article.

How Will Consumers RATE Your Product?



THE _____ DAIRY COMPANY, Inc.

Questionnaire to tell the kind of Cottage Cheese You like best.

Which of these two samples of cheese do you like the better? .....

Sample D is POOR ☐ FAIR ☐ GOOD ☐ EXTRA GOOD ☐

(Please indicate your opinion by a check mark in one square)

Sample E is POOR ☐ FAIR ☐ GOOD ☐ EXTRA GOOD ☐

(Please indicate your opinion by a check mark in one square)

Name .....

Address .....

Fig. 1—A 4x6½-in. card like that shown here is a convenient form of ballot to use in consumer preference testing. Note the range of opinion the consumer can express, from poor to extra good, when using such a ballot.

By WASHINGTON PLATT

Research Laboratories, Borden Company, Syracuse, N. Y.

EVERY food manufacturer should know by direct test how the public likes his products. This question may take several forms, such as: How does the public like my product in comparison with that of my chief competitor? Or, here is a proposed new product. Will the public like it better than the old product? Or even more simply, how can I make my product taste better? All of these questions are of fundamental importance to a food manufacturer. It is easy to see that reliable answers are not easy to obtain.

We believe that in questions of food preferences and the rating of food products by the general public, the only sure method is to go directly to the people themselves and ask them frankly how they like the food in question.

By the use of such consumer preference tests, the likes and dislikes of the consumer himself for the product may be determined and indicated changes in composition, processing or packaging may be made before the product is finally placed on the market.

The details of a method for finding consumer preferences and for telling what the results mean after you get them are given in this article.

Heretofore in the food manufacturing industries where such qualities as flavor, texture, and appearance are of primary importance, the common practice has been to grade the foods by scoring, relying on the opinions of expert judges.

Scoring must be based upon some predetermined standard of perfection to have any definite meaning. In fact, scoring of a food may be defined as the estimation of the degree of perfection which the food possesses. This estimation is based on the touch, taste, sight and odor appeal of the food to a relatively small number of experts according to definite previously adopted rules.

When properly done on this basis, scoring may be both satisfactory and reliable. Each judge states his opinion as to how closely he finds the particular food measures up to the standards set. He does not rate it according to his individual preferences but according to the adopted standards for flavor, texture, appearance and similar quality properties. Scoring of butter may be taken as an example. It would be ridiculous for one judge to give mild butter a low score just because he prefers butter with a strong flavor while another judge gives strong-flavored butter a low score because he prefers butter with a mild flavor.

Rules and precautions to be observed for successful scoring have been discussed by several students of the subject, including myself (FOOD INDUSTRIES, March, 1931, p. 108).

It is assumed that the standard of perfection set by the scoring judges is that which would be preferred by the great majority of discriminating consumer buyers. There is nothing inherently right or wrong about the standards set. The only reason for giving a high score to Swiss cheese with a large number of holes is the assumption that the consuming public likes Swiss cheese to have many holes. When factors of cleanliness, digestibility and nutritive value are not concerned the only basis for setting standards of perfection is what a test direct to the consumer shows.

THERE is such a method of evaluating foods. It is by getting the opinion of the consuming public. As an example we might make a new type of cheese and then ask a thousand prospective consumers how well they like it. Or, better still, we might submit samples of two types of cheese—the old and the new—to a thousand people and ask which they like the better.

This method of testing may be identified as "Consumer Preference Testing." The essential differences between "Scoring" and "Consumer Preference Testing" are shown by the table on the next page.

Consumer preference testing has

the special value that it is done directly by the consumer and indicates what he or she really likes or does not like. It is well known that the standards of perfection set by "expert" judges may be far from the actual preferences of the people who are to eat the product.

On the other hand, consumer preference testing presents obvious difficulties. First, is the time, trouble and expense required in consulting a great many people. There is also the difficulty of getting a correct opinion from an untrained person because of lack of interest, carelessness in marking the samples, and possibly even illiteracy. Prejudices play a large part.

In carrying out a consumer preference test to obtain a useful and reliable result, there are certain precautions which must be observed. Many of these are so self-evident that a mere listing without discussion is sufficient. Some of these precautions are:

1. Samples must be so labeled that the composition is not known to those who are to do the testing.
2. Directions for tasting, marking and reporting should be direct and simple.
3. Only a few samples should be submitted at a time—never more than three; two are much better.
4. The object of the test must be clearly understood.
5. The number and distribution of the consumers to be tested should bear a definite known relation to the market hoped to be reached by the products tested. If the list of prospective consumers is carefully chosen, 2 or 3 per cent will reflect the opinion of the whole number of consumers with surprising reliability.

Essential Differences Between "Scoring" and "Consumer Preference Testing"

SCORING	CONSUMER PREFERENCE TESTING
Few judges (e.g. 1 to 5), expert in their knowledge of the particular food.	*Many consumers (e.g. 25 to several thousand) with no special knowledge of the food.*
Judges carefully instructed to score according to fixed rules.	*Consumers cannot be carefully instructed. Rules must be few and very simple.*
Standards of perfection previously agreed upon.	*Individual preferences provide the standard of perfection for each consumer.*
Only foods for which standards have been set can be scored; e.g. butter, cheese, ice cream, bread.	*Any food can be tested, e.g. Mince pie, chocolate, artificial flavors.*

One form of ballot for use when two samples of a food are to be submited for a consumer preference test is the following:

Which do you prefer?.....
Why? .....
Name of person?.....

This ballot form has the virtue of simplicity. Under "Which?" we learn their preference. Under "Why?" we attempt to find out what characteristics the consumers do or do not like about the product. There is no attempt to put any of our own ideas into their heads by naming qualities which we think are important, but which they may not consider worth mentioning.

Suppose, for example, that we submit two samples of bread for a preference test. Sample *P* is made with milk and sample *Q* with water. Both are good bread; well made and well baked. If, with this form of ballot, we secure an overwhelming majority in favor of one sample, we naturally feel quite certain of the consumer preference. We would all know how to interpret a vote in the proportions of 90 for *P* and 10 for *Q*. But how about a vote of 60 for *P* and 40 for *Q*, or 55 for *P* and 45 for *Q*?

Does the last preference vote tell us anything at all and, if so, what? Other factors being equal could we conclude that the sales of *P* to *Q* would be in the ratio 55:45?

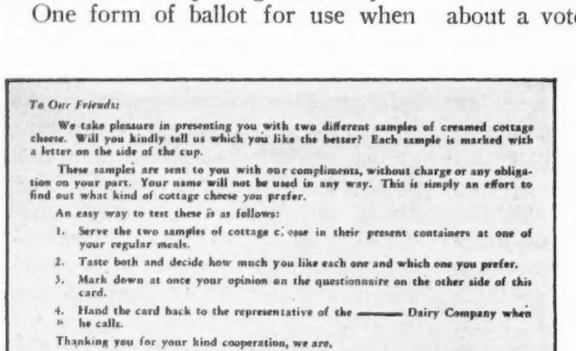
It is well to consider that an individual vote for sample *P* may have four quite different meanings. *First,* the vote may be a mere guess and not an expression of any real preference. We all know that many people are not discriminating. Many cannot detect small differences in foods. Such a person, merely guessing, would be just as likely to vote in the opposite way in another test on the same product. In any preference test where the differences are not great, a certain proportion of the votes represent mere guesses. Possibly the apparent majority vote in favor of one sample is made up of mere guesses and might be reversed on a second trial. In this case the vote would be misleading. How can we tell?

Second: A vote for *P* may denote a distinct, but nevertheless, a very slight preference. Such a person would prefer product *P,* if available. If it were not, he probably would buy product *Q* almost as readily.

Third: A vote for *P* may denote a decided preference for that product. Such a person might buy *P* if he could get it, but if *P* were not available he probably would not buy any of product *Q*.

Finally, a persons might think both products good, but prefer *P*. Such a person is important as a potential customer. On the other hand, he may think both products poor; but prefers *P*. In the present example, he may not eat any kind of bread. Such an opinion is not so important to us.

When we consider these possibilities we see that with a preference vote of 55 for *P* and 45 for *Q*, we might, under some circumstances, sell more of *Q* than of *P*. Suppose that those who voted for *Q* would accept that kind of bread and nothing else and that those who voted for *P* had only a slight preference for it and would buy *Q* almost as willingly. Or suppose that those who voted for



To Our Friends:

We take pleasure in presenting you with two different samples of creamed cottage cheese. Will you kindly tell us which you like the better? Each sample is marked with a letter on the side of the cup.

These samples are sent to you with our compliments, without charge or any obligation on your part. Your name will not be used in any way. This is simply an effort to find out what kind of cottage cheese you prefer.

An easy way to test these is as follows:

1. Serve the two samples of cottage cheese in their present containers at one of your regular meals.
2. Taste both and decide how much you like each one and which one you prefer.
3. Mark down at once your opinion on the questionnaire on the other side of this card.
4. Hand the card back to the representative of the ——— Dairy Company when he calls.

Thanking you for your kind cooperation, we are,

Cordially yours,

THE ——— DAIRY COMPANY, Inc.

SEE QUESTIONNAIRE ON OTHER SIDE

Fig. 2—On the reverse side of the ballot shown in Fig. 1 is carried a letter from the manufacturer to the consumer. This is used to explain briefly the nature of the test. It also serves to build consumer good will.

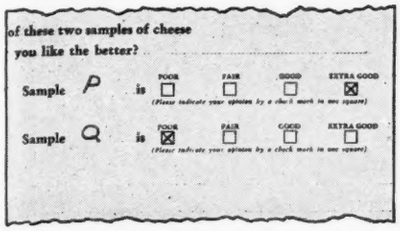

of these two samples of cheese
you like the better?
Sample P is POOR FAIR GOOD EXTRA GOOD
Sample Q is POOR FAIR GOOD EXTRA GOOD

Fig. 3—Here is an example of how one consumer voted. The ballot shows an unmistakable preference for product P. The voter liked it and will probably buy it. He would probably not buy product Q under any circumstances.

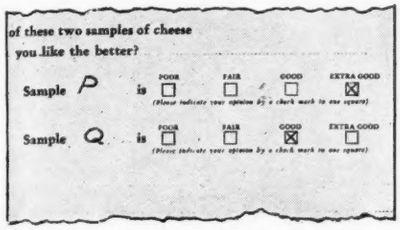

of these two samples of cheese
you like the better?
Sample P is POOR FAIR GOOD EXTRA GOOD
Sample Q is POOR FAIR GOOD EXTRA GOOD

Fig. 4—Another example of a consumer vote showed a preference for P. However, the voter liked Q almost as well, and he would probably buy it in fair volume if P were not available.

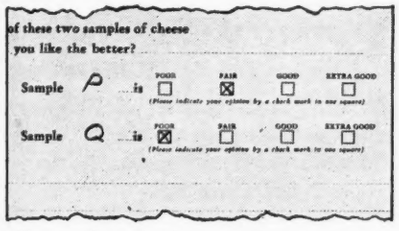

of these two samples of cheese
you like the better?
Sample P is POOR FAIR GOOD EXTRA GOOD
Sample Q is POOR FAIR GOOD EXTRA GOOD

Fig. 5—Here again a preference for P is shown, but this voter did not have a high opinion of either sample. His purchases of either P or Q would probably be small.

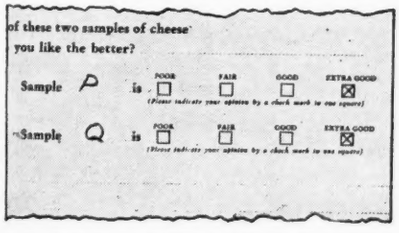
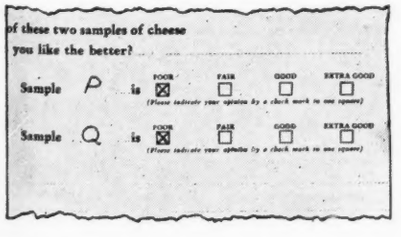

of these two samples of cheese
you like the better?
Sample P is POOR FAIR GOOD EXTRA GOOD
Sample Q is POOR FAIR GOOD EXTRA GOOD

Fig. 6 above and Fig. 7 below—Here are two examples of tie votes. But see how different they really are. The voter whose ballot is shown in Fig. 6 liked both samples equally. The voter of Fig. 7 had no use for either.


of these two samples of cheese
you like the better?
Sample P is POOR FAIR GOOD EXTRA GOOD
Sample Q is POOR FAIR GOOD EXTRA GOOD

Q expressed a definite choice, and those who voted for P were in many cases not expressing any definite choice, but were merely guessing?

How can we evaluate any given vote? How can we decide which majority is significant and how much it really means?

These problems can be solved by the use of an improved ballot.

The preferred ballot is in the form of a neatly prepared 4x6½-in. card, (Fig. 1). On the back may be printed a note telling briefly what is required. One form of this note is shown in Fig. 2.

The important part of this improved ballot lies, however, in the front of the card where the opinion of the consumer is expressed. The feature of this is the opportunity afforded for the consumer to express without difficulty how well he likes each sample (see Fig. 1).

This ballot differentiates clearly between all the different kinds of choices except the guess. It does this, moreover, with very little effort on the part of the consumer. We might receive the kinds of votes indicated in Figs. 3 to 5, all expressing a preference for P but each one indicating a different condition. That represented by Fig. 3 indicates an unmistakable preference for P. The voter likes P and will probably buy it; he would probably not buy Q under any circumstance. Vote indicated in Fig. 4 shows a preference for P. Q is liked almost as well and consumer would probably buy it in fair volume if P were not available. In the vote represented by Fig. 5 we again find a preference for P but this voter does not have a high opinion of either sample. His purchases of either would probably be small.

Figs. 6 and 7 are examples of tie votes each with quite a different meaning and calling for quite different action on the part of the proposed manufacturer. One indicates that both samples are equally good and probably would be purchased without discrimination while the other indicates both are unmarketable as far as that individual is concerned.

The possibility of guessing can be detected only by testing the same group twice with the same samples. The samples should, however, be marked differently and preferably in a different order. If the samples are marked P and Q on the first test, then the same samples should be marked S and R respectively on the second test. The second test is usually conducted on another day. Then those who reverse themselves and indicate that they had no real preference, can be eliminated or placed in a separate classification of "Guesses." In a blind guess, however, any person has a 50-50 chance of guessing the same way twice. For this reason, the total number of guesses can be assumed to be twice the number actually detected. Furthermore, it is approximately true that the number of undetected guesses will be distributed almost equally between the votes favorable to the two samples. On the basis of these assumptions an allowance can be made for guesses, if such an allowance is desired. Since there is a possibility of truth in the foregoing assumptions it is easy to understand why we learn more and feel more certain of our results when we test 100 people twice than we do when we test 200 people only once.

Even then part of the value of consumer preference testing is lost unless we have some method of evaluating the results. Doubtless there are several methods which might be used. We suggest the following:

SUPPOSE we are testing a product such as cheese which a person might reasonably be expected to eat several times a month if he likes it. The following factors will give a close approximation to the meanings of the vote as expressed on the ballot:

1. If a man marks his opinion of a sample as *Poor,* he probably will not buy it at all in any given period. Such votes are given a value of 0.

2. If a man marks his opinion of a sample as *Fair,* he probably will buy it once in a given period. Such votes are given a value of 1.

3. If a man marks his opinion of a sample as *Good,* he probably will buy it twice in a given period. Such votes are given a value of 2.

4. If a man marks his opinion of a sample as *Extra Good,* he probably will buy it three times in a given period. Such votes are given a value of 3.

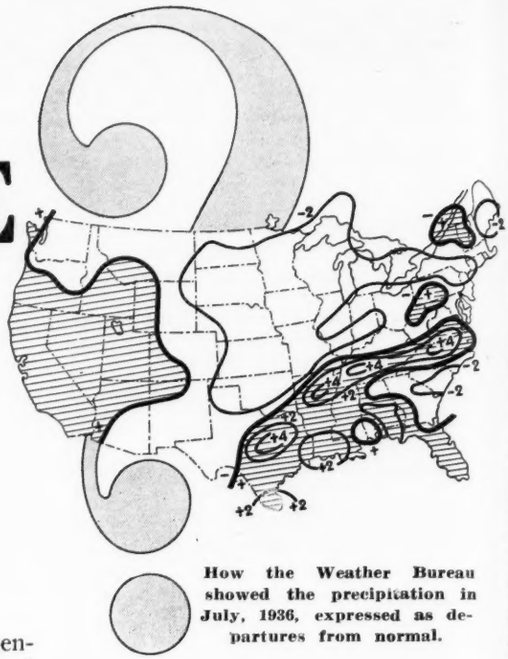
It does not matter whether the given period is a week, month or year. The value ratio between *Poor, Fair, Good* and *Extra Good* will hold in the magnitude of 0, 1, 2 and 3. These index numbers indicate the relative number of sales to be expected in any given period, other things being equal.

This system of evaluation makes it easy to draw reasonable conclusions from the results of any consumer preference test and to express the results numerically.

What Will the WEATHER BE

Will 1937 and 1938 Weather Duplicate 1914 and 1915?

BY L. V. BURTON
Editor, FOOD INDUSTRIES



How the Weather Bureau showed the precipitation in July, 1936, expressed as departures from normal.

WEATHER is the greatest unforeseen factor in the food business. It affects market, consumption, availability and prices of raw materials. Short-time effects are not the only ones. There are also long-time effects like the wholesale slaughter of livestock in 1934—a direct outcome of the famous drought of that year.

A very considerable number of men in the food field believe that they could plan more successfully if they knew definitely the type of weather to come in the next twelve months. The possible benefits of such knowledge are very doubtful for, unfortunately, knowledge is not wisdom. Nevertheless wisdom is not possible without knowledge.

Some day we will be able to forecast weather for a year in advance, and then business men will be faced with a wholly new problem, that of *what to do in the face of a very* **unfavorable** *weather prediction.*

Such a prediction was made available in August, 1935, through the publication of "Solar Radiation and Weather Studies" by Dr. C. G. Abbot, secretary of the Smithsonian Institution, Washington, D. C. Though it was available, nobody paid any attention to it. His theory is that the weather pattern repeats itself every 23 years. If that theory is true, then all we need to do is consult the weather records of 23 years ago to find out an approximation of what we should expect today.

A very brief summary of 1913 weather was published by FOOD INDUSTRIES on page 389, August, 1936. That year, 1913, was one of tremendous spring floods, the Dayton flood in particular. So was 1936. In 1913 there was a terrific drought. There was also a very severe drought in 1936. So far so good. But the winter was not quite so closely paralleled. January and February will be remembered in Northern states as exceptionally cold months in 1936, whereas in 1913 these months were not particularly severe. As near as can be estimated, the record of the year 1913 was about 80 per cent right as a forecast of the type of weather experienced in 1936.

What about 1937? Will it repeat 1914? You can be your own judge. Below is given a very brief summary of the weather for 1914 and 1915. You are advised not to bet any money on it; but you are urged to compare the weather as it develops during the year to come with the weather record of 23 years ago.

If Abbot's theory is correct and useful, there is a huge task ahead for each man to familiarize himself with the past record and decide what he would do about the weather.

» A much more detailed month-by-month summary of the weather in 1914 and 1915 will be available in mimeographed form in the office of *Food Industries.* Copies can be obtained at cost.

Summary of 1914 Weather

Warm January, normal February, winter drought, no floods in spring.

Moderate March weather, warmer in north than in south.

April, cold and very wet.

May, warmer than average. Wet in the north but drought in the southeast from New York to Topeka, to New Orleans.

June, rains in the north. Drought from Ohio Valley to Gulf.

July, corn crop and spring wheat injured by drought and high temperatures in corn belt.

August, drought broken by rains late in month.

September and October. Very late fall. No frost until Oct. 25.

November. Much warm weather but frost clear down to Miami, Fla.

December. Cold, cloudy and wet east of the Mississippi River. Cold and dry to the west.

In general 1914 was characterized by a mild winter; a drought in May, June and July in Central and Southeast portion of country; and a late fall.

Summary of 1915 Weather

Mild winter everywhere. Blustering March. Normal April.

May, June, July and August were cold and wet.

Late fall, with remarkably warm weather clear up to end of year.

What Is a Potato Chip?

An analysis of the composition of nine samples tells the story. Errors in manufacturers' claims are revealed.

By H. A. SCHUETTE and RAYMOND G. ZEHNPFENNIG

Department of Chemistry, University of Wisconsin Madison, Wis.

POTATO CHIPS were born in the brain of a temperamental colored chef way back in 1853, so legend says. Annoyed by a customer's complaint that his fried potatoes were too thick, the chef went to the "I'll show you" extreme and sliced them very thin. Then, like the true creative artist that he was, he did a bit of experimenting. He dropped the thin slices into hot fat, observed, tasted and exclaimed approval. All this having happened in Saratoga, N. Y., the original potato chips were known as Saratoga flakes.

At the time of their birth and for many years after, potato chips were potato chips. If one liked them he ate them. If he didn't, he didn't. Neither the nutritional value nor the physical or chemical composition worried the average consumer. But like so many other foods, potato chips have been highly commercialized in this fast moving twentieth century. And now manufacturers are praising their product to the public. Some of them make strange claims. A hasty study of the potato-chip advertisements suggests that some of the manufacturers have either an exaggerated confidence in the quality of their product, or they are victims of overzealous copy writers.

The advertising material falls into various classes. Some claim, without fanfare or any statements as to composition, only superior freshness and crispness for this food delicacy. A second type of promotional material says that the product is "almost as greaseless as the corn flake." Then there are advertisements which tell consumers that the chips are destarched and non-fattening, of late, changed to "less starch—less fat." These ads, of course, are intended to make consumers of those who are forever seeking reducing diets. A fourth variety of advertising would take advantage of the newer ideas about nutrition. It claims that the chips are "mineralized." Perhaps the result of wishful thinking, this suggests to the uninformed that the chips actually have minerals added.

It takes only a little reasoning to see that some of these claims are not accurate. But it took scientific analysis of potato chips to tell the complete story. No such analysis had appeared since Atwater and his associates published their classic compilations on the composition of American food materials.[1]

For the purpose of this new analysis, nine samples, marketed by as many manufacturers, were purchased in a typical Midwestern city of 60,000 population. Three of these were local products, while the others came from plants within a radius of 85 miles.

Indeed illuminating are the data obtained (Table I and Table III). Secured through standard methods of analysis (A.O.A.C.), the findings

(*Turn to page 54*)

TABLE I — Variations in the Composition[1] of Potato Chips

Constituent	Percentage composition: Minimum	Maximum	Average
Moisture	2.88	4.68	3.73
Ether extract	28.89	51.92	41.23
Protein (N x 6.25)	5.49	8.16	6.91
Starch (by diastase)	36.41	43.38	38.88
Reducing sugars	none	trace	....
Ash (chloride-free)	1.47	3.20	2.17
Sodium chloride (from Cl)	1.19	3.53	2.03
Nitrogen-free extract	7.08	16.45	9.42

[1] Moisture-free basis.

TABLE II — Comparative Data on Composition

Constituent	Atwater and Woods 1896 (1 analysis)	Atwater and Bryant 1906 (2 analyses)	Schuette and Zehnpfennig 1936 (9 analyses)
Moisture	1.8	2.2	3.73
Ether extract	35.5	39.8	41.23
Protein	7.6	6.8	6.91
Carbohydrate	50.6[1]	46.7[1]	38.88[2]
Ash (total)	4.5	4.5	4.20

[1] Includes crude fiber.
[2] Starch only.

TABLE III — Percentage Composition[1] of Commercial Potato Chips

Chips	Moisture[2]	Ether extract	Starch (by diastase)	Reducing sugars	Protein N x 6.25	Ash	Chloride (NaCl)	Chloride-free ash	Nitrogen-free extract
1	4.65	37.31	36.41	Trace	7.25	4.77	2.35	2.42	14.26
2	4.68	38.85	43.38	None	7.12	3.23	1.19	2.07	7.40
3	3.01	41.57	38.43	Trace	7.82	4.04	1.90	2.14	8.14
4	4.44	42.52	39.06	None	7.14	5.76	3.53	2.23	3.54
5	3.87	39.50	42.90	None	6.41	3.34	1.87	1.47	7.85
6	2.88	41.66	38.16	None	5.91	4.61	2.10	2.51	9.66
7	3.47	46.87	36.76	Trace	5.49	3.80	2.23	1.57	7.08
8	2.94	51.92	30.29	Trace	....	3.49	1.59	1.90	....
9	3.69	28.89	41.80	Trace	8.16	4.70	1.50	3.20	16.45
Ave.	3.73	41.23	38.88	.....	6.91	4.20	2.03	2.17	9.42

[1] Moisture-free basis.
[2] As-received basis.

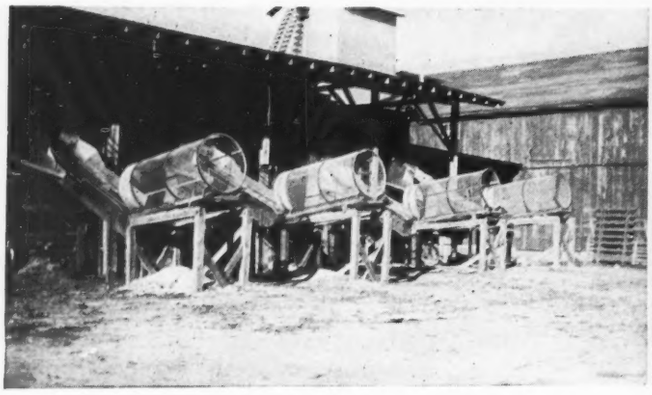


Fig. 1.—Revolving screens ahead of the viner-feed are an unusual innovation. Vines are pitched into the screen to get out the dirt, stones and so forth. It saves a lot of the work of picking them out in the factory.

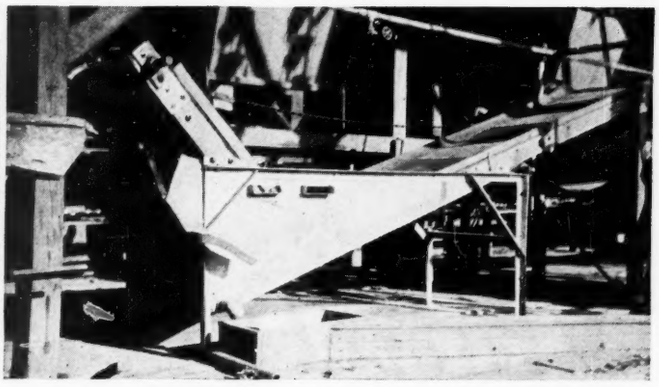


Fig. 2.—A water conveyor between each pair of viners delivers peas or beans to this washer. Pods and skins go up the steep conveyor to the left, while the washed peas and beans go up the right-hand conveyor.

INSTANT WASHING . . .

Important for Quality Control

By RALPH S. BROWN
Manager, C. & B. Canning Co., Snow Hill, Md.

FOR A NUMBER OF YEARS I have noticed the difference in the flavor of canned peas and lima beans when the shelling has been done by machine (a viner) and when it has been done by hand. The better flavor comes from hand-shelled peas or beans. The cost of hand-shelling, however, is prohibitive. Hence a way has been sought to improve the flavor of machine-shelled peas and beans by more prompt handling and washing than has been the previous practice. The new method has proved to be a very considerable improvement.

Two theories have been advanced to account for the flavor changes in machine-shelled peas and beans:

(1) That the flavor change is caused by absorption of a considerable amount of vine juice. The latter is, of course, liberated by the mechanical action of the beaters in the viner, for as is well known, the common practice is to harvest the entire crop, vines and all, then pass them through the threshing machine to separate the peas or beans from the pods and then sift them out.

(2) That the flavor change is caused by enzymatic action set up by the bruising which the peas or beans receive when they pass through the vining machine.

Many experienced men believe that the second, or bruising, theory explains all the possible flavor changes. But, in my opinion, the vine juice is also a factor of even greater importance. When freshly vined peas or beans are caught in boxes and allowed to set around until they are dry, it is almost impossible to wash off the dry juice. Hence to improve on previous practice, we have developed a method of conveying peas and beans from the viners in a stream of water. This starts the washing operation almost instantly.

Our factory is small. We operate only four Hamachek viners, and have them located right at the factory. They are driven by a steam engine in order to get the variations of speed necessary for complete vining. We believe that vines fed into a viner should be as clean and as free from dirt and grit and foreign matter as is possible. If this dirt is removed

▶ ***Mr. Brown has demonstrated that it is possible to pack in cans baby lima beans that, on the dinner table, are almost indistingushable from "raw" or frozen limas. Rapid handling of the raw material and prompt washing are important factors in his quality control. Naturally these methods are of direct interest to vegetable canners, yet there is a principle involved that applies to all users of "living" raw materials, such as:***

Canners of vegetables.
Users of fresh produce.

before vining, naturally it does not need to be removed afterwards from the peas or beans. Therefore our viners are preceded by a revolving screen, shown in Fig. 1. Vines are pitched into the revolving screen and are cleaned, then pass on into the usual feeder of the viners.

Between each pair of viners is located a shallow inclined trough through which water flows to convey the shelled peas or beans to the washers. In the bottom of these troughs is a set of removable riffles in which are caught any cinders, stones, or bits of glass. These washers are of our own design and are built so that pieces of pods or leaves and many split peas or beans are floated off, while any sand or grit goes to the bottom. (See Fig. 2). The basic principle of our plan of operation is to start washing the raw material the very minute it comes from the viners.

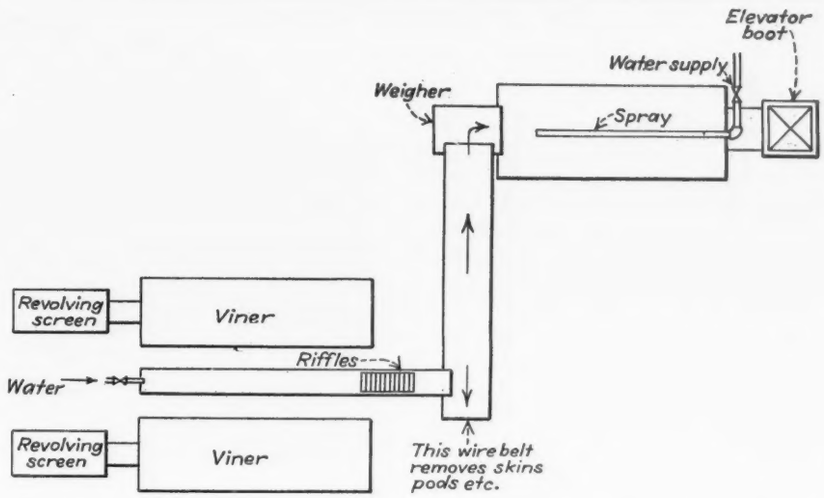


Fig. 5.—Layout of a conveyor-washing unit with revolving screens placed ahead of the viners.

AFTER WASHING, the next step is continuous automatic weighing in order to get our production records started. These automatic weighers are set to register every 20 lb. passing through. They deliver to a revolving screen Fig. 3, which permits the escape of any undesirable material smaller than the required size. In other words, it scalps the peas or beans preparatory to grading for size. A spray of water plays on them, thus carrying the washing operation one step further. We are strong advocates of plenty of washing.

From the revolving screen washers, they are conveyed to the third floor of the plant and delivered into two vertical cylindrical tanks, 36 in. x 9 ft. high, each holding about 3 tons of peas when full. These tanks constitute a surge point in our operations. Delivery from the storage tanks is to the usual rotary size-graders to separate them into three sizes.

Then the peas or beans pass on to an inclined belt (Fig. 4) which carries away any splits or skins while allowing the round ones to roll off. Regular belt inspection comes next. They are now ready for blanching which, in our plant, is a very short operation and is carried out at 180 deg. F. Following this treatment comes a combination washing and inspection, then filling into pans and subsequent brining. Next the filled cans go to the can-closing machines and finally to the retorts for sterilizing by heat.

By this method we handle our peas and beans continuously and quickly. Generally less than two hours elapse between the vining operation and the can. This is a fact and not a slogan. Another advantage of this method is that we have no investment in boxes for handling the shelled peas or beans. When operating on peas we run four shifts of six hours each: 7 a.m. to 1 p.m.; 1 p.m. to 7 p.m.; 7 p.m. to 1 a.m.; 1 a.m. to 7 a.m.

AN UNFAILING supply of water is indispensable to this method of handling the raw material. It gives a product of good flavor, clear liquor and free from foreign matter. Two years' experience with it convinces us that it is a permanent improvement that probably can be developed still further. The whole idea is to prevent the vine juice from soaking into the raw material. Otherwise our method does not differ materially from good commercial practice.

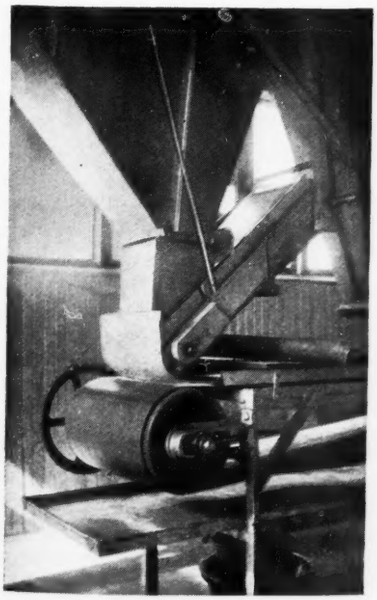


Fig. 4.—Before passing over the inspection belt, the raw material falls against this small rising inclined belt, which carries away anything which will not roll.

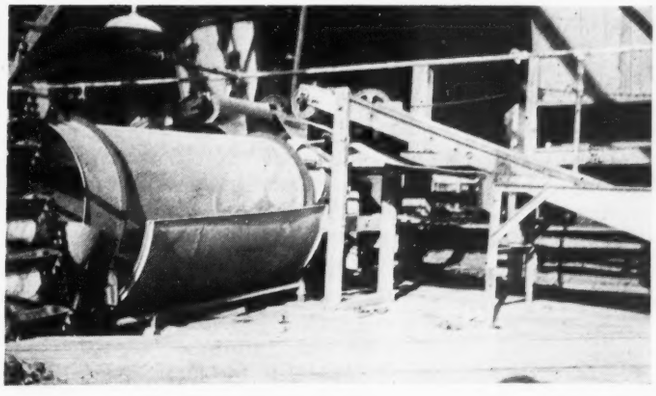
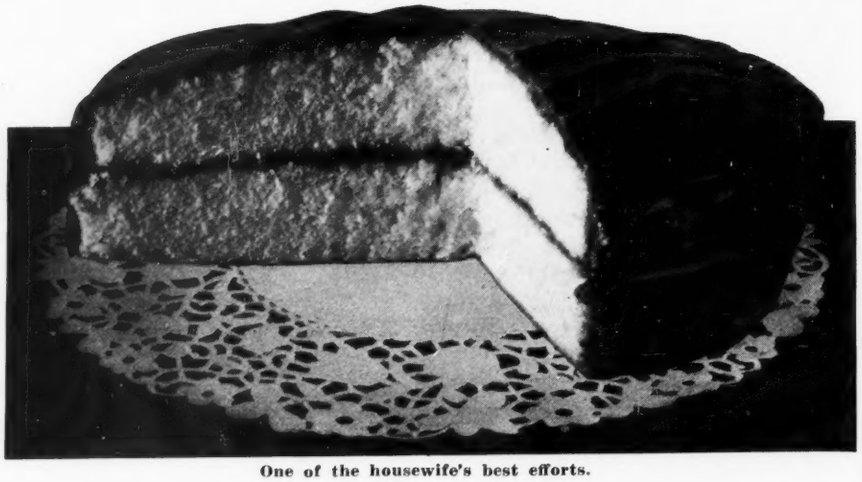


Fig. 3.—Delivery end of washer at right dumps into automatic weighers which discharge into the far end of this rotary scalping screen.

New facts about shortening use help bakers meet housewife wants.

By H. S. COITH
Procter & Gamble Co., Ivorydale, Ohio



One of the housewife's best efforts.

"Let the BAKERS

UNTIL RESEARCH INVESTIGATORS hit upon the virtue of making certain modifications in manufactured shortening, bakers were not making much headway in their competition with the housewife in baking cakes for home consumption. In fact, previous to this discovery, bakers never claimed more than 20 per cent of the total consumption of cakes in the home. Even that volume of the cake consumption was acquired by the bakers only after many years of effort.

Early 1936 estimates indicate that about 30 per cent of the cakes now eaten in the homes are bakery made. This 50 per cent gain by the bakers has come in the short period of about three years. Even more significant is the fact that the cake buying trend is continuing to gain momentum and that bakers themselves are feeling more confident of their ability to get and hold the housewife's cake business.

Here is noteworthy progress for the food manufacturer in a field heretofore dominated almost autocratically by the housewife. When viewed at the close range of what individual bakers have done, the ground gained by the cake baker becomes even more impressive. Increases of 100 to 300 per cent in cake sales by individual bakeries have become common during the past three years. Not so common but more convincing have been increases of as much as 900 per cent.

Such increases in sales by food manufacturers do not just happen, even in the United States where housewives are not only willing but anxious to spend their time and energies somewhere other than in their kitchens. Gains as large as these testify that some definite step has been taken by the food manufacturer to break down the almost inherent resistance to factory produced foods.

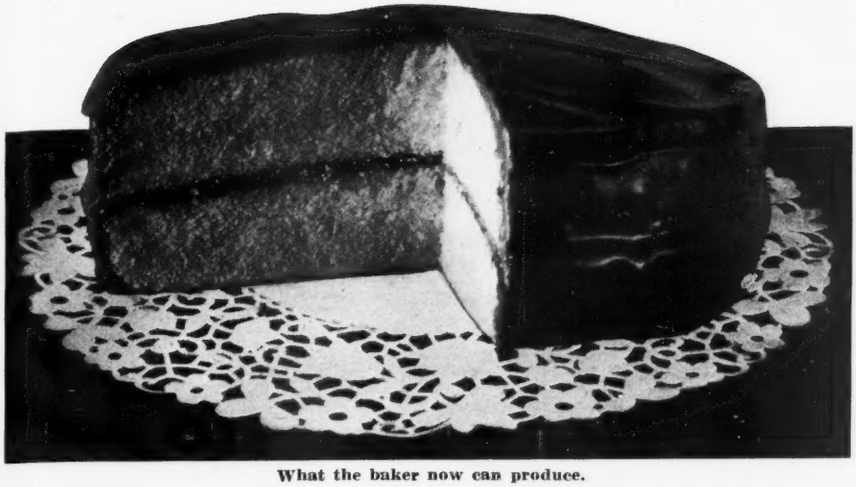
Because this resistance is being overcome by the baker, food manufacturers see in it another example of an established fact. The housewife will generously reward the food manufacturer with her patronage when in addition to saving her time and giving her freedom for activities other than working in her kitchen he can also give her food of such quality that she and her family accept it on a par with what she herself makes.

The primary reason for this trend has been that the quality of bakers' cakes has taken a decided upward trend in the past three years. Formerly there was a definite difference between home-made cakes and those made by bakers. It was a difference which had long been recognized, and whenever a comparison was made between the two products the difference was almost always unfavorable to the baker's cake.

VARIOUS REASONS were given to account for this difference. The explanations ranged all the way from the one that the baker and the housewife used different ingredients to the one that it just naturally requires a touch of domestic genius to give a cake that certain quality of excellence. The real difference became known only after a thorough study of the composition of the two types of cakes.

To eliminate the guesswork concerning the difference, a systematic survey was made by research workers comparing household cake formulas with bakers' formulas. For example, a study was made of yellow layer cakes. Recipes for this type of cake were obtained from bakers in many parts of the country. For the most part these recipes were found to be very similar. But, to equalize any slight variations, they were averaged with the result that the average baker's yellow layer cake was found to contain the ingredients shown in Column 1 of the accompanying table. A similar study was made of household recipes for yellow layer cake taken from a number of representative household cook books. After converting the cups and spoonfuls as given in the cook books to pounds and ounces, to put them on a basis comparable to those of the baker, the average housewife's yellow layer cake was found to contain ingredients in the proportions shown in Column 2 of the table. Both recipes are based on 100 lb. portions of flour.

While the assembling of the averages and the conversion of amounts to a comparable basis was a complicated and time-consuming task, the results when tabulated tell in a very simple manner the reasons why the baker's cake did not taste like that of the housewife's. The housewife's recipe calls for a higher amount of sugar, a greater proportion of eggs, a



What the baker now can produce.

Make the Cakes"

larger addition of milk, and an extra amount of shortening. Certainly no one could expect the two formulas to make products which tasted alike.

Similar studies on other types of cake showed the difference to apply generally. No matter what kind of cake was under consideration, the housewife's recipe for that cake was always richer than was the baker's.

The apparent logical move for the baker to make was to use the proportions of ingredients which the housewife used and to make his cakes from formulas containing additional amounts of sugar, eggs, milk and shortening. Many bakers tried to do just this only to find that when cake batters based on these richer recipes were handled on their mixing equipment, the results were not at all satisfactory. The richer batters made on a bakery scale of production would not stand up during baking. They fell and the cakes became soggy from the excess of enrichening ingredients.

CLEARLY here was a real stumbling block for the baker. It was evident that the solution of his problem was more fundamental than ingredient ratios alone. If he undertook to mix by hand as the housewife did, he could not get out an adequate production. He had to use his machines to make cakes in large enough quantities to keep his business going. On the other hand, when he used his machines, he could not use materials in the proportions in which the housewife used them and consequently could not make products which tasted like hers. On the surface, his problem seemed an insurmountable one. The solution to the difficulty came from what may be regarded as an unexpected quarter—from a change in the composition of the shortening used.

Why that should be can probably best be understood through a brief review of the development of shortenings in recent years. After we have made this review, possibly we shall see that the solution of the baker's problem through a change in the composition of the shortening was, after all, not such an unexpected development as it may seem.

Not so many years ago the shortenings which both the housewife and baker used were butter and lard. Both had come to a place of high esteem in the opinion of housewife and baker because they had certain very desirable characteristics. On the other hand, both had certain limitations. A notable one was a lack of uniformity. The fats were affected by the type of food eaten by the animal from which they came, by the seasons of the year, and by the geographical location in which they originated.

With the introduction of manufactured shortenings came a degree of uniformity, which the natural shortenings did not have. This uniformity was one of the first strong claims that manufactured shortenings had for seeking a market. In the course of time, however, shortening manufacturers found that characteristics other than mere shortening quality could be imparted to manufactured fats. The added qualities made them superior to the natural products in certain respects. One of these desirable characteristics early given the manufactured fats was an increased keeping quality. This advantage was slight at first, but now it has been developed to a point where, if desired, a manufactured fat can be made with keeping qualities—resistance to rancidity—about ten times as great as those of the natural fats used for shortening purposes. This meant that not only the fats but also the baked goods containing them could be shipped longer distances and handled more satisfactorily under various temperature conditions.

A second advance which the manufacturers of shortening made over the natural fats was an improvement in what the baking trade knows as creaming qualities; the property of beating up to a light frothy mass with eggs and sugar. By developing a shortening of high creaming quality, the fat manufacturer was able to give the baker a means of making lighter cakes than he had ever known before. But, batters made from such shortening still did not have the property of carrying the rich ingredients of the home style cake batters when subjected to machine handling.

FROM the foregoing examples we see that it has been possible to impart to a shortening various desirable properties other than its mere shortening qualities. It is not surprising then to find that it was also possible to bring about an improvement in the manufacture of shortening which gives to the product a capacity for holding enriching ingredients.

This last improvement has, in fact, enabled bakers to produce cakes with higher proportions of enriching ingredients than the housewife herself uses in her cakes as is illustrated in Column 3 of the table. In fact, the baker is now able to bake a cake which may be regarded as even more a "housewife's" type cake than the housewife herself makes.

YELLOW LAYER CAKE FORMULAS

Ingredients in pounds	1 Old-Fashioned Baker's Cake	2 Home Made Cake	3 Modern Baker's Cake
Flour	100	100	100
Sugar	90	118	140
Eggs	42	55	60
Milk	58	66	95
Shortening	35	48	50
Salt	2½	2½	2½
Flavoring	x	x	x
Baking Powder	3	6	6

x = as desired.

By C. A. SOUTHWICK, JR.,

General Foods Corp., New York, N. Y.
Research and Development Department,

PROVING GROUND *for Packaging Materials*

Ways to evaluate workability, durability, appearance and protection.

IN RECENT YEARS there have been a great many new developments resulting in an increase in the number and type of materials available for the construction of paper packages. Many of these new developments have been in the field of protective materials. The proper evaluation and application of these new materials has necessitated the use of new testing technics to compare their worth with the older materials.

In considering a new packaging material, the ease with which it may be processed is one quality that must be considered. The paper, sheeting or carton stock must have physical properties which allow it to be efficiently formed into the finished package. The stock must have surfaces which print, fold, score or take adhesive easily. This property of workability is determined from physical tests and by running sample lots of stock through the equipment.

Durability is another attribute of a good packaging material. The package must stand the handling and scuffing given it in shipping without being damaged or marred. It must also be strong enough to protect its contents through the usual hazards of handling. There are two simple ways of testing for durability. One is to prepare a number of sample packages and put them in a mechanical shaker or tumbler. The other way is to place the packages in a shipping case and send this case over several times the greatest possible shipping distance.

With the emphasis which is today being placed on eye appeal, materials must be selected with regard to their surfaces, so that the finished package is a pleasing and attractive result. The appearance of a carton stock or paper can be improved by treating the surface with waxes, press varnish, spirit varnish, lacquer or similar finish. But for the best results, the surface should be selected with regard to the finishing process to be used. The appearance of the completed package must be resistant to change caused by light, heat and the effects of shelf exposure. This property may be tested by exposing samples either to direct sunlight or to ultra-violet rays from an ultra-violet lamp or some other source.

The ability of a packaging material to protect the product must be given very careful consideration and the final choice of materials should be based on the results of comparative tests; the amount of protection offered by a material cannot be determined by visual examination. There is also danger in over-protection. This not only is damaging to certain products, but it adds unnecessary cost to the package.

The requirements of the product, its composition, shelf life and the climate of the region to which it is to be shipped determine the kind and amount of protection which a package must have. If a product contains oil or fat, the package must retain the oily substance and not be stained by it. Fatty materials also require a careful selection of papers to prevent them from becoming rancid too quickly and to avoid the absorption of foreign odors.

FOR GREASE RESISTANCE, the package will include one of the following materials; glassine, parch-

ment, a paper treated with some kind of a grease-proof coating, foil or one of the transparent sheetings. Some products contain a large amount of fat, and in such cases, the package must be so formed that a layer of the greaseproof materials is sealed around the product. Products having a high fat content usually are given special handling during warm weather or in regions where temperatures go above the melting point of the fat. It is difficult to make a paper package which is sufficiently oil-tight to prevent leaking or staining if much free oil is present.

BY FAR the greater number of products require some degree of protection against the transfer of moisture vapor either into or out of the container. This protection can be obtained by the use of lacquered paper, foils, papers which are laminated or treated with wax, asphalt or other materials, or by the use of transparent moisture-resistant sheetings of cellulose base materials.

Before a decision is made on the value of one type of package for a given product, some kind of comparative storage test should be made. It has always been a strongly contested point whether laboratory tests give as accurate information as actual field tests. Those favoring field testing methods maintain that in this type of test the sample is exposed to the conditions which the product actually encounters. They further contend that in this manner they are able to determine actual shelf life. Supporters of the laboratory testing method believe that the field test is not as reliable as an accelerated test in the laboratory, since it is very difficult to get a reliable record of the temperature and humidity conditions of field exposures. They also argue that it takes too long to get a definite answer.

Packages on test in thermostatically-controlled insulated cabinet.

The facts seem to indicate that, if properly carried out and carefully interpreted, the laboratory tests have the greater usefulness. Such tests can be repeated with reliability, and definite changes can be brought about in a comparatively short time. There is also a psychological reason that is very much in favor of the laboratory test; it is quite laborious and difficult to get field men thoroughly to understand what is required, and so there is a tendency to cut down the number of samples to simplify the test. In the laboratory, the whole matter is in the hands of scientifically trained individuals, and it is a simple matter to include a large variety of package samples.

THE LABORATORY EQUIPMENT for properly making such tests is not necessarily elaborate or expensive. In the case of fatty products, or products which carry moisture, it is only necessary to have an insulated chamber with properly spaced shelves and an accurate thermostatic control. The control should operate some type of low-heat-capacity electric heaters, such as iron-wire coils. With such a cabinet and a good balance for weighing it is easy to run such comparative tests.

The procedure is to make up a few dozen of each type of package under consideration and include an equal number of the present packages as a control. For the determination of grease resistance, the technic is to hold the storage temperature above the melting point of the fat, then observe how long it takes for the grease to penetrate. If the problem is one of retaining the moisture of the product, however, each package is given an identifying number and its weight recorded. A few packages are opened and the moisture content of the product determined. The remaining packages are placed in the cabinet, periodically weighed and the moisture content determined at intervals of a week. Unless the package is one which has extremely high resistance to moisture-vapor transfer, a good index of the protective qualities of the package can be had in a month or six weeks of holding at a temperature of 100 deg. F.

For dry powders or products which are unfavorably affected by the absorption of moisture vapor, a more elaborate type of cabinet is required. It is then necessary to place the package in a warm, humid atmosphere. For this purpose, a cabinet must operate at high humidities. Therefore, careful engineering is required in its construction so that uniform conditions can be maintained without danger of precipitating water on the samples. With a cabinet of this type, the testing technic is similar to that described for packages containing moisture, but in this case, the package increases in weight as the product increases its moisture content. A few packages can be opened and the conditions of the samples recorded each time the samples are taken out for the weekly weighing. A cabinet of this type will give a very satisfactory indication of the moisture-vapor resistance of a package in about four weeks at a temperature of 100 deg. F. and a relative humidity of about 90 per cent.

With such testing equipment and with a sufficient number of standard packages as controls, very reliable and quick tests can be performed. Cabinets can be constructed with time-cycle controllers so that storage conditions can be made to duplicate the temperature and humidity changes that occur daily in any part of the country. Such cabinets would be of some advantage since they would cause the test samples to "breathe" in the manner in which this occurs on the shelf. However, the advantage of being able to cause this effect is hardly worth the extra cost of such elaborate equipment. Packages in cabinets having only thermostatic control would be subject to breathing from changes in barometric pressure.

BY USING these testing methods, the particular factor which causes package failure can be emphasized and results which might show as inconclusive trends in a field test become very definite conclusions in an accelerated test. It has been contended that the data of a laboratory test cannot be converted into terms of shelf life. It must be borne in mind, however, that the term "shelf life" is a very loose one, and it can have only an approximate value because it is dependent upon locality and weather conditions.

$40,337 SAVED in Sales Cost

Rearranging Deliveries Brings Distribution Economies

By A. H. FOSTER*
Industrial Engineer, Washington, D. C.

HOW can delivery costs be reduced? This is the question that will require a better answer in the future than it has had in the past, or is getting in the present. I have been asked this question many times by men at the head of milk companies whose responsibility it is to see that their companies make a profit. They have come to realize the importance of the fact that delivery costs are the largest item of operating expenses. And with this realization, they want to know how these costs can be reduced.

"Just how important is this expense item?" one may ask. One of the best sources for this information is probably the investigations by the Federal Trade Commission of the milk industry in Connecticut, Philadelphia, Boston, Baltimore, Cincinnati, and St. Louis. These showed that delivery costs varied from an average of approximately 47 per cent to approximately 60 per cent of the total operating expenses. Since this one item alone may mean a profit or a loss, it is little wonder that operators are interested as to whether, and how, it can be reduced. If they are not interested, changing conditions will force them to be or their negligence will cause them to be left behind in the highly competitive milk industry.

Can delivery costs be reduced? The answer is, yes! Occasionally, of course, there may be plants with such efficient operations that costs are at a minimum, but the great majority undoubtedly have appreciable possibilities for savings. However, in the minds of most operators, it is probably not so much a question of the need as it is of technic to be employed in doing the work. The writer, as an industrial engineer, has been able to study the problem closely, thereby coming to certain conclusions and has been able to develop a technic in putting these conclusions into operation.

Some time ago the management of one milk company was confronted with the problem of whether to keep both its horse-wagon and motor vehicle routes, or whether to take off the horses and wagons and motorize all the routes. Naturally, the decision depended on which combination was the most economical. Studies indicated that 100 per cent motorization was desirable.

The studies of the operations of this particular company brought out certain principles which were used in consolidating routes and thereby reducing costs. As a result, out of 77 routes, fifteen were actually eliminated (see the accompanying table). In addition, two spare vehicles were supplied for use while others were repaired, six of a certain undesirable type were replaced, and while the survey was going on, business had increased in volume by 6.2 per cent. If this increase had not occurred, five additional routes could have been consolidated, making a total of twenty or a possible reduction of 25.97 per cent. These results when costs were last checked warranted an estimate of yearly savings of $50,000. Likewise, according to this check, the savings during the first twelve months, six under partial reorganization, and six under full reorganization, were estimated as $40,337.67.

After a preliminary study of another plant with 150 routes, it was estimated that fifteen routes could be eliminated with a savings approximating that already mentioned. In the former case, however, 100 per cent motorization was utilized, while in the latter case, it would not have been necessary to realize the estimated savings.

Now as to how this can be accomplished. Many operators have undoubtedly attempted to reduce their delivery costs, and curiously enough have tried to do this by motorizing. Most of the time they have done this because of the arguments of motor car salesmen who speak of increased capacity, increased speed, low costs and similar details which the busy milk dealer does not have time to investigate. However, based on the apparent logic of the arguments, he begins to motorize.

Accordingly, he replaces many of the horse and wagon routes with

---

▶ ***Actual time study, with a stop watch, of the activities of retail route salesmen, made this saving. Any food manufacturer who employs truck routes for the distribution of his products, can use the same method, including***

Bakers
Dairymen
Ice Cream Makers
Meat Packers
Producers of perishable products including coffee, potato chips, and salad dressings.

---

*Mr. Foster was formerly connected with the Economic Division of the Federal Trade Commission and specialized on studies of delivery costs.

How Delivery Costs Were Cut in One Milk Company by Studying Routes

	Before	*After*
Motor Vehicle Routes	28	62
Horse and Wagon Routes..	49	
Points* Per Route Per Week	2,240	2,972
Cost Per Point* $0.0377		$0.0311
Actual Savings Delivery Costs, first year.....		$50,000

*A driver salesman sells milk in quarts and pints; cream in half pints; butter in pounds; eggs by the dozen and so on. What is the cost of a unit of sale? To compute this figure, the dairy industry has utilized a loose term called the point. It is not rigidly defined, and a single company may even use two systems of points for different purposes. A point is an arbitrary unit usually used for allocating costs of delivery and selling to the various products or for computing a salesman's bonus. For example: some dairies call 1 quart of milk 1 point; 1 pint of milk ½ point; ½ pint of cream 1 point; and adopt other arbitrary figures for other products or other quantities being sold.

motor vehicles. The usual way to do this is to split one horse and wagon route, giving one-half to each of two motor vehicle routes. Inasmuch as a motor vehicle costs more to operate than a horse and wagon, this will rarely result in savings. In some cases, even with the addition of one-half of another route, the extra load space in a motor vehicle is only partly used. In other cases the load space may be completely used, but the customer layout is such that actually the driver has more work than he can handle without losing business. In one case coming to the writer's attention, a company had its vehicles loaded on an average of only 60 per cent. More important, however, is the fact that because of the route layout the greatest part of the vehicle capacity usable with a full working day would be only approximately 70 per cent.

In another case (that of the 150 routes previously mentioned) it was estimated, based on actual observation, that thirteen of the routes were overloaded, while thirteen were far underloaded.

This leads us back to principles and we find that in considering low costs, it is impossible to get away from this two-way principle:

1. Savings can be brought about by keeping same costs and increasing volume, or

2. By keeping same volume and lowering costs.

Without meaning to complicate matters it is probably apparent that the two mentioned might be joined to form a third point in the principle, which is: Increasing volume at the same time that costs are decreasing would result in a savings.

The several examples given indicate the fact that management does not always know the routes. The most logical thing to do first, then, is to find out the makeup of the routes and what is taking place on the routes. By this is meant the products delivered, the mileage covered, the kind of buildings in which the customers live, what floor they are on, whether they live in the front or rear, whether the route is in hilly or level territory, and the most important of all, the time, or how long it takes the driver to perform his various activities during the day. This last is emphasized because while knowledge of some of the others may not be necessary, it is absolutely necessary to time the driver's activities. This timing is done with a stop watch. It must be done by an experienced observer who meets the driver when he first comes to the plant and stays with him until he is through for the day.

Some of the items timed during the day will be:

1. Getting route vehicle.
2. Waiting in line for load.
3. Loading various products.
4. Time traveling to route.
5. Time of delivery to customers.
6. Vehicle time moving from one customer to another.
7. Loafing.
8. Breakfast, lunches, etc.
9. Shifting load in vehicle.
10. Selling.
11. Collecting.
12. Checking in.

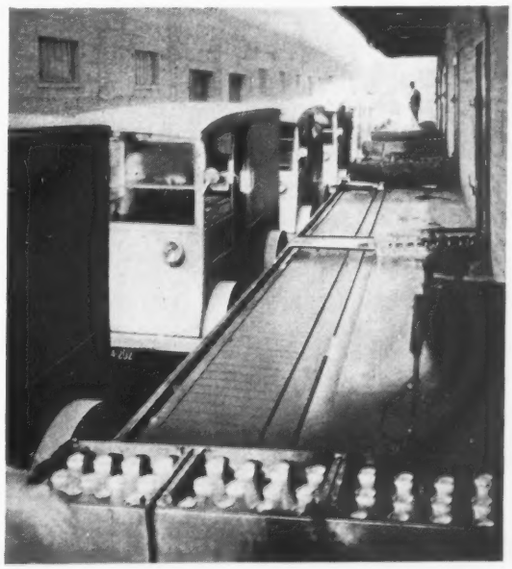
Without the information obtained by this timing, anything done in reorganizing routes is simply a matter of guess work and, as has been the case in the past, is likely to cause some unwanted results. Customers, mileage, points, or any of the other quantities usually used as standards are unreliable because of the extreme variations. Since time can be given a definite value, the writer considers it the most reliable standard as well as the fairest to the drivers. The value of the standard may be a seven, eight, or nine-hour average working day, depending upon prevailing hours in other local industries or existing agreements with the drivers' local union.

The various activities of the driver and the time taken to perform them should then be studied to find out which are time wasting and unnecessary. They may occur partly because of the driver's personal inefficiency or to some extent because of the layout and organization of the plant. Wherever they are, they should be eliminated. Then, if the checked time is not already over the selected average working day, the time used to perform the so-called time-wasting activities can be used to deliver to additional customers.

For example, suppose the average standard day was set at nine hours including meal time and the actual time clocked was nine hours, but observation showed that one hour was wasted. This would mean that the hour could be used for serving additional customers. Likewise, if the time clocked was under the standard, the difference could be used for additional customers. All routes should be analyzed for the existence of this "available time."

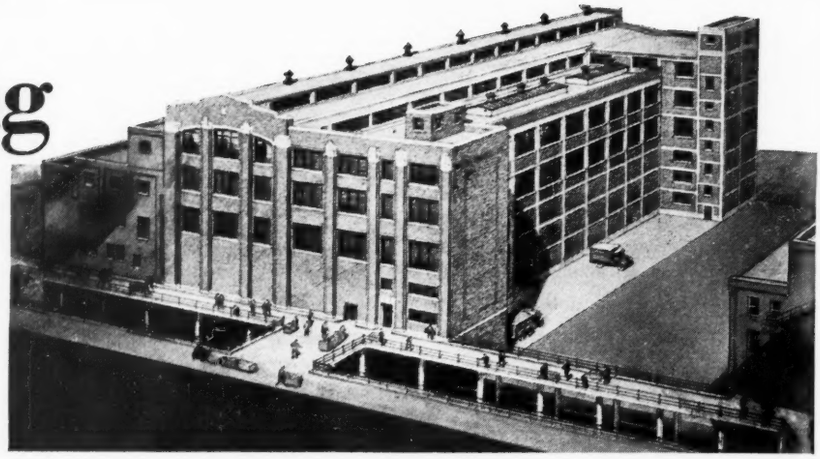
In some cases it may be found that routes are working longer than the standard day. Hence, in bringing them down to the set standard a certain amount of the available time will be lost, but the net amount of extra available time can then be converted into terms of routes. For example, if it was found that there were 54 hours net available time, this would be divided by nine, the standard day, and would result in six or the number

(Turn to page 43)



Some dairies seek to cut delivery cost by motorizing their vehicles. This is not effective, however, unless the routes have been arranged so that the motor trucks are used to best advantage.

Food Plant Engineering at Armour's



World's largest beef house involves up-to-minute ideas in construction and equipment

By F. A. LINDBERG
Chief Engineer, Armour & Co., Chicago, Ill.

THE NEW BEEF HOUSE of Armour & Co., Chicago, was built to replace an old plant which was costing large sums yearly in renewals and repairs to maintain the building structurally. Designed to handle 2,200 cattle a day, the new plant is a six-story structure. The main section measures about 100x240 ft. In addition, there is a wing 100x60 ft., 40 ft. of the length of which is six stories high and the remainder, four.

Besides the slaughtering of cattle and the processing of the byproducts from them, the building is used for the chilling and packing of selected meats from hogs and sheep and the storage of casings.

To attain highly sanitary conditions in the plant, sanitary floors, walls and drains, as well as good ventilation and adequate lighting were provided. And stainless steel was used on a large scale in the processing and materials handling equipment. Although this metal costs about ten times as much as ordinary steel, about 23 tons of it were put into the tables and other equipment. Stainless steel does not corrode under the action of water, salt solutions, fats, fatty acids and other substances encountered in the packing plant. And it presents a bright, smooth surface which may be cleaned easily and quickly and which needs no polishing.

Outstanding among the stainless-steel equipment in the Armour plant are the two eviscerating tables. These are endless belts composed of stainless-steel "slats." Each table is 5 ft. wide and 60 ft. long. Paunches are removed from the carcasses, dropped onto the slatted tables and discharged, after inspection, into stainless-steel spiral chutes at the ends of the tables.

EQUALLY as important as sanitary equipment from the viewpoint of cleanliness, is the sanitary construction of the building. Except in the freezer and basement hide cellar, the walls of the six-story plant are faced with glazed brick, finished at the floor line with a vitrified cove base, or curved molding.

Window openings are provided on the inside with sloped terra cotta sills to match the brick work, making a finished and impervious wall surface.

Vitrified split brick are used in the floors, these being laid on a waterproofing membrane over a concrete fill which is sloped to provide the desired pitch for drainage. Watertight joints were made around the pipes where they pass through the floors. The galvanized sleeves around the pipes are fitted with welded flanges and clamping rings.

Floor drainage and process water is collected into one system and discharged into a battery of Loeb-type basins where all fats, floating solids and the like are removed by skimming. Then the water is further clarified by passing through a settling basin to remove the heavier matter. The water then discharges to the city sewer.

The other waste in the plant, the refuse coming from the cleaning of intestines and paunches, goes to a separate disposal system and is passed through a mechanically operated self-cleaning screen. Fibrous material which the screen takes from the water is dried by means of a Davenport press and is hauled away in motor trucks.

Precaution is taken to prevent filth from being carried into the plant on the cattle. Held temporarily in roof pens on a level with the killing floor, the cattle are driven into the knocking pens through a long corridor. Brick-lined, this corridor is narrow so that the animals must pass through in single file. And along each side are perforated pipes which discharge water under controlled high pressure to wash all dirt from the cattle and at the same time cool the animals.

The construction of the killing and

bleeding area is unusual in that it is separated from the processing floor.

Operating conditions on the killing and offal floors are improved in the new beef house by the use of unit heaters and power-driven ventilators. These ventilators keep the "warm" departments free of vapors, and prevent moisture from condensing on the great expanse of window glass. This results in bright, clean rooms, better workmanship, good accommodations for government inspectors and savings in cleaning the equipment and conditioning it.

The ventilators, which effect a complete air change in about eight minutes, are equipped with manually operated dampers which permit the intake of outside air as required to control the humidity. Then there are recirculating and bypass dampers, making for a flexible arrangement for both winter and summer operation.

On the slaughtering floor, the unit heaters and ventilators keep the temperature at about 70 deg. F. In the room where casings are dried, the air is circulated at a temperature of 125 to 130 deg. F.

To provide good natural lighting, large windows, monitors and skylights containing 16,000 sq.ft. of glass were built into the plant. On the top floor, where the killing, skinning, eviscerating, inspection and other operations are done, the area of the window glass equals 35 per cent of the floor space. And special glass is used over the inspection tables. This glass is blue-tinted to give a daylight effect and to filter out the heat rays.

For artificial lighting, 1,150 electric lamps were installed. These provide intensities ranging from two foot-candles in the hide storage to 65 foot-candles over the viscera inspection tables. The reflectors used for general illumination are standard RLM porcelain-enameled steel units. But where operations require illumination on a vertical plane, reflectors of the elliptical-angle type were installed. Specially designed lighting units are used over the viscera inspection tables. They are mounted relatively high to illuminate the entire field of operations and eliminate shadows as far as possible.

Refrigeration has been made efficient in the new beef houses. In designing the building, the coolers and freezers were placed on the four lower floors, with the warm processing departments above them. The refrigerated section is insulated vertically at the walls and horizontally above the fourth floor with corkboard. In order to obtain as completely an unpenetrated enclosing envelope as possible, the wall columns are split above the basement to permit the installation of the corkboard.

Refrigeration throughout the building is by means of open-type brine-spray units, the brine being supplied from a central system. Brine coils are used in the corridors, water-chill tanks and vats, while direct-expansion wall coils and bench coils refrigerate the freezer. The direct expansion coils are of the flooded type, with float control. On the offal floor, the use of ice has been eliminated by the use of brine coils in processing vats. Temperatures in the refrigerated departments vary from a high of 50 to 55 deg. F., in the hide cellar to a low of –10 to –15 deg. F. in the freezer, with a temperature of 34 to 36 deg. F. being maintained in the product chill room.

The system of supplying hot water, a great quantity of which is used, may be of interest to other food processors. The beef-house operations require water at four temperatures—90, 120, 180 and 210 deg. F. The largest portion is supplied from individual heaters at temperatures of 90 and 180 deg. F. The 120-deg. F. water is secured through an automatic mixing valve supplied from the other systems. Water at 210 deg. F. for sterilizing the viscera tables is obtained by passing a supply from the 180-deg. F. system through a booster generator. All water temperatures are automatically controlled.

THE DRAINAGE SYSTEM above the ground is of Arco threaded cast-iron pipe with recessed fittings. Galvanized wrought-iron pipe was installed in the hot and cold-water systems. Miscellaneous process piping is of steel, as are the compressed-air and steam lines. Exclusive of piping for refrigeration, about 73,000 ft. of pipe is installed. It is mostly welded.

The insulation for the refrigerating lines, both ammonia and brine, consists of a three-ply hair-felt covering, while magnesia insulates the steam and hot-water piping. Cold-water lines are covered with an anti-sweat material to prevent dripping. In locations where damage to insulation might occur, and on riser lines near the floor, the insulation is armored with sheet-metal covering.

Outstanding among the structural features of the building is the rigid-frame concrete-girder construction supporting the roof and machinery loft over the slaughtering floor. This permits an unobstructed floor space of 60x200 ft. for the floor work and half-hoist operations, there being 22 skinning beds in this space. There is also a clear space of 40x200 ft. for operations done on the carcasses as they hang from overhead rails. There is only one line of columns in the 100-ft. width of the top floor.

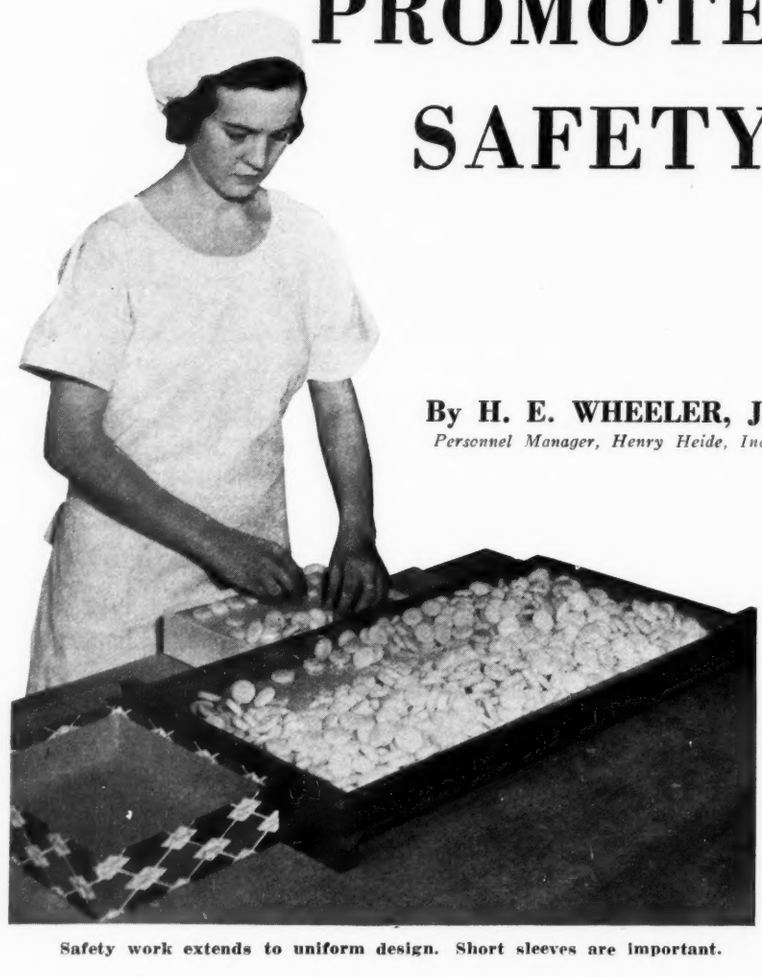
General view of slaughtering floor. It shows good lighting, the 60x200-ft. clear space where floor and half-hoist operations are done, the concrete girder construction (top, left) making the unobstructed space possible, the sanitary floor construction and drainage, and overhead conveyors and hoists.

(The methods of handling materials in the new Armour beef house will be discussed in a later issue of FOOD INDUSTRIES.—The Editors).

How Henry Heide, Inc.

PROMOTES SAFETY

By H. E. WHEELER, Jr.
Personnel Manager, Henry Heide, Inc.



Safety work extends to uniform design. Short sleeves are important.

NO MACHINE is fully or completely guarded unless and until it is so covered and protected that no one can come in contact with any moving part—unless deliberately.

Machines are often guarded to what is considered a reasonable height. We will guard the sides and the point of operation but will not guard spaces under the machine or any point which we feel is inaccessible to the worker while performing normal duties. Often there are within these open and neglected spots small shafts, wheels, gears and other moving parts. In one instance, a foreman remarked. "You'd have to climb under the machine to get near that gear." Workers often do (I hope) get under a machine to clean the floor and the machine. Sometimes the operator will neglect to stop the machine—or if stopped, someone may inadvertently start the machine—and there have been many such instances in industry—or a draft may blow an apron or a loose sleeve into contact with moving parts, and if the cloth is strong, the person is drawn in.

Years ago we determined that loose clothing should be avoided, as it has been the cause of many accidents. We therefore designed special uniforms for both men and women. All uniforms have elbow length sleeves and the women's aprons are of the slip-over type with belts which are stitched into the side seams and tie in the back.

I RECALL A MACHINE which had been thoroughly protected to a point more than 5 ft. from the floor. But a man working on the next machine slipped and instinctively grabbed for something to support him, and his hand hit above the guard of the machine. His glove was enmeshed in the gears and his hand drawn in—result, one finger gone and two others rendered practically useless.

When considering whether a guard is necessary we must ask ourselves the question—"Is it possible that anyone, either accidentally or carelessly, could come in contact with moving parts?" If the answer is YES or PERHAPS—the machine should be guarded.

Converging rollers of every type have an inherent hazard in every industry. Forming, shaping, marking and cutting rolls, regardless of type, should be guarded at the point of operation. Manufacturers of rollers have attempted to provide point of operation guards for these rollers, but have not progressed as far with safeguarding as they might, because operators and foremen have varied ideas as to the best type of such guards. Many operators ask "What will I do if the batch sticks to the roller?" But it is possible to provide easily removable point-of-operation guards.

Such guards should be placed so as to allow just enough clearance for the batch to pass under, and far enough from the roller so that, should the operator permit his hand to travel with the batch, his fingers cannot come in contact with the roller. This rule also applies to all types of slitters and cutters. Chocolate rollers should be provided with a bar so placed that the hands cannot reach the roll at the point of contact. Such bars do not interfere with the grinding operation and do not interfere with production.

I am convinced that no dough mixer is ever safe unless fully covered while in operation and provided with interlocks or two handed shifting devices. If the kettle is of the tilt type and the movement of the

This address is reproduced through the courtesy of the National Safety Council.

arm is required to throw out the batch —even with the two handed device, it is necessary to keep a table in front of the kettle at all times. If possible, the unloading of tilt type kettles should be a "one man" operation to eliminate the danger of "some one else" turning on the switch or tampering with the shift.

Were you ever struck by a flying transmission belt? Neither were we, nor would we wish this to happen to anyone else. To forestall such accidents, we have within our repair department a belt specialist whose sole duty is the care, maintenance, repair and installation of belts. This work keeps him busy constantly, and in addition to reducing the possibility of such accidents, his work has been a good investment. Proper care increases the life of belting, provides better transmission and eliminates many machine "shut-downs."

We were also convinced a number of years ago that elevators require the attention of a specialist and we therefore also have an elevator mechanic whose principal function is the maintenance and repair of elevators. He inspects the entire mechanism of every car every morning.

The cleaning of moving machinery is a hazard of the "invitation" class and should be positively prohibited under all circumstances.

Choppers and shredders of the "meat chopper" type should be provided with a hopper sufficiently high that the hand cannot reach the cutting element. If the material fed into the hopper is not free-moving, a hard wood agitator should be used.

In reviewing accident involvements, our experience shows that 44 per cent of lost time accidents during an 18 month period involved fingers, hands and arms. In a cross section of the industry comprising 25 confectionery manufacturers, it was found that in the same 18 month period 60 per cent of all lost time accidents involved fingers, hands and arms.

A CHALLENGE to our ability to control the "methods of working" is very apparent in the fact that 43 per cent of all lost time accidents in this group, were finger accidents. In our own experience, only 7 per cent were finger accidents, whereas 19 per cent were hand involvements and 15 per cent arm involvements. If the industry could eliminate finger, hand and arm accidents our compensation rate would be cut about in half.

Internal trucking equipment, hand trucks, platform trucks, starch board trucks and similar rolling equipment, should be cleaned, oiled and inspected periodically, using the check-off system, so that none are neglected. I believe that this work should be done semi-annually. Many hernias, strained ligaments and similar accidents have been caused by the attempt to handle heavy loads on trucks with defective wheels and dry bearings.

The industry uses a great many starch boards and other boards for the handling of both finished and semi-finished products. Periodic inspection of these boards tends to eliminate the possibility of splinters and protruding nails.

Maple flooring is used rather generally in the confectionery and other industries. Maple is durable and easily cleaned. However, because of its close grained texture, it is not an absorbent and liquids dropped thereon do not quickly disappear but remain on the surface and become a hazard. Workers should be impressed that wet floors are dangerous and should be mopped up immediately. It is my contention that ANY time is cleaning time if the condition of the floor warrants it.

We cannot neglect to stress goggles or some form of eye protection for every operation in which there is an inherent eye hazard. We realize that the workers are reluctant to wear goggles, but it is possible to obtain a type goggle which provides protection and is not unduly uncomfortable. The most strenuous objectors to goggles seem to be those who do not normally wear glasses. But we tell them, "You'll have to get used to them just as you would to new glasses or a new set of false teeth—or perhaps you'd rather break in a glass eye."

Some people have made the statement that accident frequency has increased with the installation of wage incentive systems. I cannot substantiate those claims. I admit that our frequency rates have been higher during the last five years than they were in the preceding five years, but this has been amongst the workers who are not paid on an incentive system, but who are employed in such departments as shipping, trucking, maintenance, and boiler room.

It has also been contended that accident frequency in the confectionery industry can be attributed largely to seasonal labor turnover. The labor demands of the industry are somewhat seasonal, but we cannot attribute lost time accidents to that cause. To the contrary—a least 75 per cent of our lost time accidents have involved employees who have been with us ten or more years—or who have had at least ten years previous experience. Our greatest accident frequency has been during the so called off-season.

The majority of the accidents in our plant during the past 5 years, are in the "handling material" group and have been caused by the carelessness or thoughtlessness.

AFTER MULLING OVER some of our experiences, we are more convinced than ever that best results can only be obtained through education. This education cannot consist only of posters and safety literature, although these have their proper place. We are too prone to say—"We have posters displayed—such and such an accident is just the type accident we warned against in the poster displayed two weeks ago—the man should have known better." The average worker may read the poster and he may read the safety message, but his attitude usually is "that's all right for the other fellow—but it will never happen to me."

Therefore, IF management has provided every possible mechanical safeguard—clean, safe and orderly workrooms and floors, and IF our educational program is thorough and interesting—and IF our safety committees are functioning as real live entities and not merely as paper organizations—the burden of accident prevention, education and instruction devolves on the foreman. It is the foreman's responsibility to instruct new workers in the correct and safe way to perform a job. The right way is always the safe way. It is also his responsibility to see that safe conditions prevail in his department and that all of his workers are working safely. It is also his responsibility to see that small and apparently minor injuries are not neglected and that each receives first aid treatment immediately.

It is essential that authority to safeguard machines should be so delegated as to avoid delay—guard orders to the mechanical department should receive immediate attention and it should not be necessary for all such orders to await the approval of the Workmen's Committee and then of the General Committee.

How to Avoid Contamination in Syrup Handling*

Pipe lines and valves used by bottlers in handling syrups must be made of corrosion resistant materials.

▶ ***What you make your equipment out of is fully as important as any other feature of your plant (see FOOD INDUSTRIES Materials of Construction Number, December, 1935). Here is some timely advice on materials suitable for handling non-acid and acid syrups. This information originated in the carbonated beverage industry, but is of interest to any manufacturer of—***

Beverages
Canned Foods
Fountain Syrups
Fruit Juices
Jams
Jellies
Preserves

METALS COMMONLY USED for water lines are not satisfactory for syrup handling. Ordinary wrought iron, steel, galvanized iron, brass, or copper must not be used.

The reason for this is that the acidifying agents and the sterilizers generally used seriously corrode these metals. This results in metallic contamination of the syrups and, consequently, of the final beverage.

Stainless steel, glass enameled steel, nickel, and high nickel alloys are the most universally satisfactory materials. Block tin and high quality bronze are suitable in certain instances. Less applicable, and suitable only under less severe conditions, are aluminum, copper and stoneware. In certain types of tubing for special purposes, glass and rubber are satisfactory. The accompanying table, from ABCB Educational Bulletin No. 9, shows the types of materials that have been found satisfactory for various types of syrup equipment.

To be absolutely safe, equipment should be made of materials that will withstand the most severe conditions encountered. Suppose equipment for handling a non-acidified simple syrup were made of some of the less resistant materials. It would be possible that, through accident or change in routine, an acid product might be put in such equipment. The result would be contamination of the product.

Pipe Lines. Block tin tubing has been most used in the past for syrup piping, because of its availability and the ease with which it can be formed and fitted. However, it is not universally the best material with respect to corrosion resistance. Also, it tends to become brittle with age and, unless it is continuously supported it will sag, resulting in sections that do not drain properly. Tin-coatings on stronger metals overcome these difficulties, but there is danger of contamination when the tin wears away and exposes the base metal.

(*Turn to page 43*)

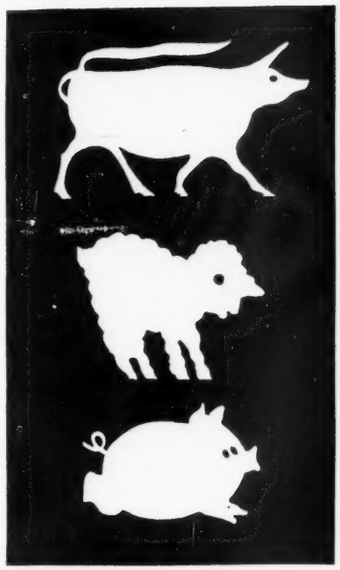
SUITABILITY OF MATERIALS FOR CONSTRUCTION OF SYRUP EQUIPMENT

USE	SATISFACTORY	FAIR	UNSATISFACTORY
HOT-PROCESS SYRUP *WITHOUT* ACID	*Stainless steel Glass enamel Nickel Nickel-copper alloy **Block tin	Aluminum ***Bronze Copper Copper	Stoneware
HOT-PROCESS SYRUP *WITH* ACID	Stainless steel Glass Enamel	Nickel Nickel-copper alloy Bronze Block tin	Aluminum Copper Stoneware
COLD-PROCESS SYRUP *WITHOUT* ACID (Storage of non-acid syrup)	Stainless steel Glass enamel Nickel Nickel-copper alloy Bronze Block tin Stoneware	Aluminum Copper	
COLD-PROCESS SYRUP *WITH* ACID (Storage of Acidified syrup)	Stainless steel Glass enamel Nickel Nickel-copper alloy Stoneware	Bronze	Copper
PIPE LINES VALVES FITTINGS	Stainless steel Glass enamel Glass tubing Nickel Nickel-copper alloy	Bronze Block tin Aluminum Rubber hose (acid resistant)	Copper
CARBONATED WATER	Stainless steel Block tin Bronze Silver plate	Nickel Nickel-copper alloy	Copper Aluminum

* Stainless steel means both the KA2 and 18-8 types of steel, properly heat treated and fabricated to give best corrosion resisting properties. ** Block tin means either block tin or pure block tin over suitable base free from pinholes. *** Bronze means either high high quality silicon or aluminum bronze of high acid resistance.

Complete report of the investigational work is given in the A.B.C.B. Ed. Bulletin, "Suitability of Materials for Syrup and Carbonating Equipment."

*Digested from "Syrups Lines And Valves," a paper by John M. Scharf, Director, Technical Service, American Bottlers of Carbonated Beverages, read before 1936 annual meeting in Chicago, Ill. on Oct. 19, 1936.



The Hormel animal family trade mark used on both company packages and motor vehicles.

SELLING POWER OF PACKAGES

Extended to Truck Bodies

Family design developed for containers is applied also to motor vehicles

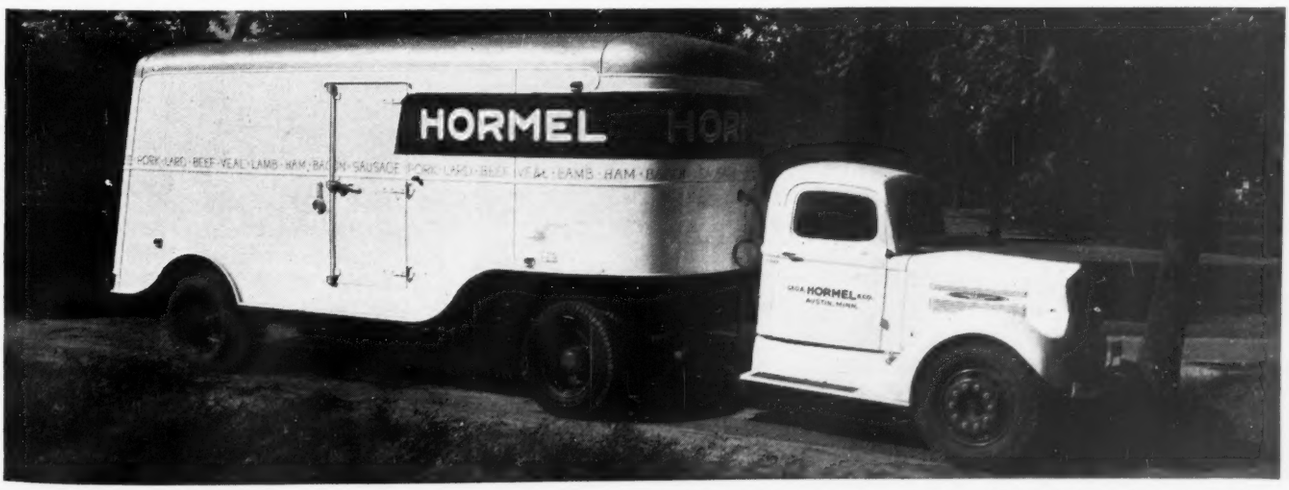
WHEN A FOOD MANUFACTURER decides to revitalize his sales efforts by repackaging his line—and to tie up his motor vehicle equipment with the scheme—certain automotive problems are encountered. Just what these problems are and how they were solved in one outstanding instance is an interesting example of building good will by subtle methods.

The story has to do with the experience of Geo. A. Hormel & Co. of Austin, Minnesota. Back in July, 1933, George Switzer, industrial designer of New York City, was retained by the Hormel company to work out a comprehensive family of packages to identify its many meat products. The general design was extended to its properties and equipment. These included refrigerator cars and motor truck equipment.

Many months were spent in preliminary studies, tests, analyses and investigations of every phase of the problem. Its solution may be summarized in two principle factors of design treatment. These are, first, the adoption of a family trade mark of three animals, the steer, the sheep and the pig; and, second, the adoption of white as a basic identification color.

THE TRADE MARK of the animal trinity is unusual in that the figures are conventionalized, even whimsical. The figures are not realistic representations of their familiar barnyard prototypes. The steer might have been one of Moses' sacrificial bullocks. The sheep is as comical as Mary's lamb. The pig looks as if it were one of the Three Little Pigs of nursery fable.

On the label of each package appears the white silhouette of that animal from which the contents of the package were derived. For example, the steer is shown on packages containing beef products; the pig on those containing pork products and the sheep on those having mutton ingredients. This arrangement identifies the package as undeniably containing meat, and likewise the kind of meat. The purpose of the whimsical characterization is to bring a smile to the face of the prospective purchaser in the hope that he or she



One of the 300-odd Hormel motor vehicles, a white painted tractor and a large semi-trailer. The size of the latter has been made to appear smaller through a full rounded edged roof; a contrasting aluminum roof paint; a stream-lined rear end a narrow name-panel.

Four of the 800 Hormel items showing variations of the new packaging with the animal family trade mark and the tie-up with the Hormel motor equipment as pictured on these two pages.

will be more likely to purchase.

A combination of the three animal characters, arranged one above the other, is shown in one of the accompanying illustrations. The tie-up between these package characters and the company's trucks is obtained by painting the same combination on the rear truck door. This arrangement is shown in the illustration at the bottom of this page.

In this tie-up, it is to be noted that the color combination is reversed. On the packages the animals are in white silhouette. On the rear truck doors, they are in green of the same hue that is used to identify the company's Dairy brand, which is the first-quality line of the three that are used by Hormel.

The reason for this deviation lies in the contrast required by the adoption of white as a basic identification color for the truck bodies. White is obviously a color suggesting cleanliness. Cleanliness connotes purity. Both are essential in a food product. And so the adoption of white as a basic truck body color ties in with the purpose of the same basic color of the Hormel packages.

THE ADOPTION of white as a truck body color also has some advantage as a heat reflector on insulated or refrigerated bodies. But paint of itself cannot be made to take the place of adequate insulation or refrigeration. To maintain any desired inside body temperatures, adequate insulation and refrigeration must be built into the bodies, irrespective of the color of the exterior paint employed. While white paint undeniably reflects heat waves to a greater extent than a darker color, it is quite difficult if not impossible to trace any reduction in refrigeration expense to the use of white paint as an exterior body covering.

Aside from its emphasis on cleanliness and purity and its heat reflecting qualities, white as an exterior body color lends itself admirably to display. It also provides a contrast to name lettering, catches the eyes of passers-by and therefore gives better all-around advertising value than can be obtained with the darker-colored paints.

But the use of white as an exterior truck body paint has some disadvantages. First, it makes the body look larger than it really is. Next, it tends to turn slowly to a cream or yellow color under the action of the sun. Then, if the body is scratched or dented, it is most difficult to touch up the damaged parts without the new paint being quite noticeable. And lastly, it is the most expensive color to keep clean since it shows every spot of road dust, oil, tar or other form of dirt.

The work of unifying some 300 Hormel trucks of all shapes, makes, sizes and color schemes presented many problems. After a year of testing white in combinations with several other colors, a glossy white paint was selected in conjunction with a warm grass green. The white selected withstood the action of the sun without undue discoloration and, with care, it can be used to touch up scratches without too much contrast in color.

But the white paint made the trucks, and especially the semi-trailers, look larger than they really were. To overcome the feeling of resentment that many people have against huge trucks that take up too much of the road width and are difficult to overtake, Mr. Switzer planned a scheme of painting that would make them appear lower and generally more agreeable to the motorist. This included rounded roof edges to give a lower roof line; a contrasting aluminum roof paint and a relatively narrow belt panel for the Hormel name on each side of the body at the extreme front.

IT was acknowledged that food trucks should be washed often enough to look clean. The washing problem with the basic white body color was lessened by painting the wheels green; the cab-step black; and by paying special attention to the design of such details as door handles, hinges and other parts that might tend to rust or collect dirt.

Close-up of one of the Hormel trucks showing the animal family package trade mark on the rear door. Note also the listing of some of the products such as sausage, pork, lard, ham, bacon, etc., in light grey, in lettering just above the body moulding.

Puncture-Proof TIRES?

. . . *Yes, and No*

MUCH MAY BE SAID both for and against the use of puncture-proof tubes in truck tires. Sometimes it pays to use them. Sometimes it doesn't. The pros and cons of this important truck-operations question are presented below by fleet operators who know whereof they speak. Comments by other operators appeared in this department last month.

Good on Some Routes

Elimination of accidents due to blow-outs at high speed, lack of interruptions in schedule and time saved in changing tires are benefits of puncture-proof tubes.

Whether the benefits justify the extra cost of the tubes depends upon where the trucks are operated. If in a neighborhood where tires pick up nails and tacks readily, benefits are pronounced.

We have not found that puncture-proof tubes reduce tire mileage. With tires inflated properly and an occasional inspection to remove all foreign objects, they travel about normal mileage.

We do not believe that every territory requires the use of puncture-proof tubes. We have several territories in which we are using these tubes with excellent results. There, the additional expense is justified because of the number of punctures before the trucks were equipped with these tubes. But it is unnecessary to use puncture-proof tubes on our other trucks.—H. E. WENNAGEL, *Traffic Department, Wm. Schluderberg—T. J. Kurdle Co., Baltimore, Md.*

Not Satisfactory

We have experimented with the puncture-sealing compounds and have had some experience with puncture-proof tubes, but neither has given us any satisfaction in regards to expense or maintenance.—D. R. BOYER, *Superintendent of Motor Vehicles, Hathaway Bakeries, Inc., Cambridge, Mass.*

Regular Tubes Good Enough

Our own fleet is almost 100 per cent light equipment. We carry a spare tire on all cars and endeavor at all times to have the tire equipment in good condition. The quality of any of the standard makes of tires is such, at the present time, as to give unquestioned mileage, even in poor territory. And we figure it is really less expensive to maintain good all-around equipment than to use such things as puncture-proof tubes or puncture-sealing compounds.

The principal value of puncture-proof tubes was where perishable foods were being transported and where delays might cause spoilage. Today, this factor is practically negligible as such foods are generally transported in refrigerated bodies. And tire quality is such that, unless the tires are used for excessive mileage, there is very little chance of delay, particularly if the car carries a good spare.

To equip all of the cars in a fleet of any size with puncture-sealing compound is expensive, and if tires are kept in good condition, a very small percentage of the compound would actually be used for sealing punctures. Another thing is that it does not take much weight to unbalance a wheel. Some of the compounds used have weight enough to cause trouble in that respect.

We do not believe that the extra expense of puncture-proof tubes is justified, considering the little trouble given by tires having present-day quality.

The additional weight of puncture-proof tubes is not likely to reduce the mileage which is obtained from the casing.

We do not believe it is good policy to have any vehicle out without a spare tire, even if puncture-proof tubes are used. It is true that such tubes may prevent deflation due to punctures, but there is no guarantee that the valve on the tube might not go bad and necessitate the use of another tire.

Regarding the use of a tire as a spare after it has been taken out of regular service, this is difficult to answer as people have varied ideas as to the value of the spare tire. It is the common practice to use a tire which has been repaired, or partly used up, as a spare. This perhaps is practicable where a vehicle does not cover long trips, or where dual wheels are used. But as a matter of safety, both for the drivers and for the public in general, we still believe that the policy of carrying a spare tire in good condition is best. Chances are taken with one which has perhaps been repaired after a blow-out or has the tread worn so much that it is really not fit or safe to use.—C. L. JONES, *Automobile Division, General Foods Sales Co., Inc., New York, N. Y.*

Distribution QUESTIONS CLUB

The PENALTY of Being Self-Satisfied

THERE is a certain type of man in industry, even in the food industry, who is a problem to his employers. He is a problem to himself, too, only he is too pleased with himself to realize it.

In his own estimation he is a success. In fact, judged by all standards that he knows anything about, he *is* a success. And he is not always a foreman. Sometimes he is a superintendent, and in rare cases he gets up as high as factory manager.

First Foreman in his Family

Let's take an actual case of the self-satisfied foreman. His granddad, his father and all his uncles were working men. All his friends and all his relatives never did anything but common labor. Now, we are not ones to throw asparagus on common labor as a job, for we have served our time and have had to do plenty of common labor just to make a living.

One day after some years of good work, this man had been promoted from the ranks to a supervisory job. He was the first guy in the whole Whoosits family, as far back as anybody can even remember, who ever got such a promotion. Was he proud? You bet he was. And he still is.

Stops Developing

Being already a success in his own esteem—a success that overshadows all the rest of his old acquaintances—he has stopped developing. Having arrived, he asks himself, why keep on trying and striving?

Sometimes we meet his kind in plants. Good, steady, reliable chap he is. And he hangs on to that job with the proverbial grip of a drowning man.

If anybody shows up in his crew who looks pretty good and appears as if he might get the foreman's job some day —well, he knows how to handle that. You can't exactly blame him. But even his employer can't get him out of his foreman's job by promoting him. Why? Simply because he is not ready for a higher job.

After ten years' experience as a foreman he has not progressed one inch in his thinking, his training or his ability beyond the place where he was as a good workman. When night comes, he goes home and forgets all about business till next morning. He doesn't believe that his higher-paid boss often lays awake nights studying and planning for the success of the business.

His own idea of what to do with his leisure time is that it is time to be killed. He has no notion that he can go any higher. And, anyway, leisure time is his time—not the company's. He reads the front page of the daily paper and the sports pages, takes a peek at the funnies and turns in. He has no desire to learn more about his business, his industry or its technology or its problems to prepare himself for the tougher job ahead.

We have heard men of this type boast that they never read. Not long ago we met such a chap. He was a baker. On inquiry as to his reading habits—he modestly denied any such habits. Asked if he ever read any of his bakery publications he blurted out,

"Naw! What do I have to read for? *I* know how to bake. I *learned* my trade."

From the standpoint of the foreman alone, perhaps he is right. Only he does not stand alone. He has a boss, sometimes two or three of them. And then there is the whole world moving by at a fearful rate.

Sometimes we talk to the top man about his employees, especially those employees who are so satisfied with themselves that they haven't thought up a new idea in years. If self-satisfied men could hear their employer's comment, they wouldn't be so satisfied. They would realize that they are faced toward the gate even though no one has yet decided to push them out.

Even Managers Lose Out

What about the superintendent or factory manager who has gotten as far as what he *thinks* is success? Such a man also once boasted to us that he didn't need to read or study. He had been through the mill. He *knew*. He never went to a convention. What for? Big waste of time. Salesmen, he was sure, were waiting in line to keep him posted on what was new.

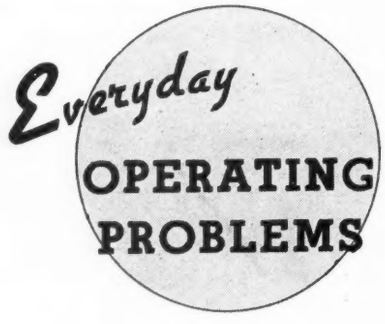
His car, his home, his dogs, his guns, his fishing tackle were the envy of all the neighbors. He lived the life of Riley. Then one day the elderly owner of the business died. The heirs, not understanding the business, wisely sold it. And they never told him a thing about their plans. They didn't seem to know the business but they knew the man. The new owners closed the plant —temporarily, it was hoped. Anyway he was out. So were all the rest of the help.

Then the ex-factory manager discovered for the first time that nobody knew him. He thought he had a wide acquaintance with the industry but he had not kept up these few contacts. He spent a couple of years trying to make up for lost time. He tried his best to get a foot-hold somewhere, and failed. He had few friends other than his hunting companions. Good pals, to be sure, but unable to assist him. The future looks very unpleasant.

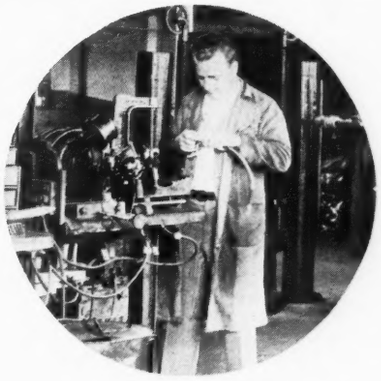
Verily, the satisfied feeling of success exacts a terrible penalty. No matter where a man is, whether in high position or low, he has to progress and learn and develop. Current events move at an amazing rate. As it has been so aptly put: A man today has to run like hell in order to stand still.

Lest You Forgot

Under pressure of day-to-day problems, one is likely to forget a good suggestion unless he is able to use it at the time. We have in mind such a case as the means by which one plant cut power costs by $63.02 a month and how a second saved $57.87. This was explained in "Correcting Power-Factor Lowers Operating Costs," August, 1934, page 362.



MAINTENANCE . . .



How Shall it be Done?

WHAT SYSTEM do you follow in doing your maintenance work? Some plants find it best to carry on this work continuously, while the plant is in operation. Others make periodic shut-downs so that the equipment can be overhauled and put into good shape without interfering with production operations. Still others use a combination of these two systems.

Engineer Given Daily Maintenance Schedule

Our plant is in operation practically 24 hours a day and does not have extra units which we can switch to in case of a breakdown or to make repairs. For these reasons it is imperative that our equipment be kept in running condition.

From our years of experience we have found that most of our troubles have been caused by lack of system in lubrication and knowledge of the wear on the fast moving parts of the various bakery machinery. To correct this condition we made a systematic study of our equipment a few years ago. In this study we included the care required for our refrigerating system, dough mixers, air conditioning equipment, dividers, rounders, proofers, molders, ovens, and wrapping equipment.

We found that each type of equipment requires a regular cleaning and lubricating schedule. On the basis of this study we set up in our plant a number of lubrication schedules such as A. B. C. D, and so on. By following the schedules the entire plant is covered at regular intervals.

Now our plant engineer's daily work is laid out for him. On Monday morning from 8 to 8:30 he blows down the boilers and makes short inspection trip in plant. From 8:30 to 10:30 he does plant lubrication on schedule A for instance. Under this schedule are all bearings that need lubrication on Monday. From 10:30 to 12:30 he cleans, makes a thorough inspection of, and lubricates the ice plant. In a comparable manner he proceeds to do the day's work. Each day he alternately takes care of the different equipment in a systematic manner and so that each gets its turn.

Also two or three hours of unscheduled time are set aside in the plant engineer's schedule for "at once" jobs, "jobs" or "manana" jobs, and "Saturday" jobs. (In explanation, the plant engineer has a set of hooks over his work bench with blank cards available for each shift foreman's use.) In the event that during the night or, for that matter, during any time of the day the shift foreman has a maintenance job coming up, he does not personally hunt up the plant engineer and tell him that certain machinery needs attention. He simply makes out a card. If the job is important the card is hung on the "at once" job hook. If the job is not so important the card is hung on the "job" hook, indicating that the plant engineer can do it within the next two or three days. If the job happens to be one that can be done at any time, the card is hung on the "manana" hook, meaning "tomorrow" in Spanish. That classification means when he can get to it. Of course, some jobs come up which can be done only when the plant is shut down which is Saturday. The card for such a job is hung on the "Saturday" hook.

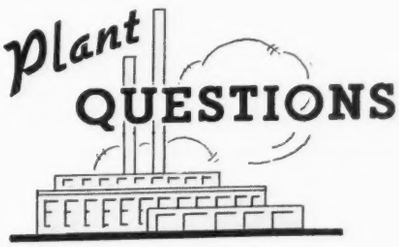
We have found by following this schedule that it works very satisfactorily and that we have been able to use our equipment much longer and to better advantage than we would if we did not have such a plan.—CARLOS S. PICKERING, *Olson's Bread Co., Los Angeles, Calif.*

Repairs Done at Lunch Time and Week Ends

Repair and maintenance work on packaging equipment is done during the lunch hour and on Sundays or holidays. This is necessary because during some seasons of the year we operate almost continuously. During the other seasons the repair work can be done during the early morning hours if of serious enough nature. By keeping the equipment in good working order at all times major breakdowns have been avoided.

In the mill, repair work is done during the one or two hours the mills are down for roll washing. When the grain comes from the garlic areas, it is necessary to wash the break rolls every morning to maintain their efficiency which is impaired by the garlic juice exuding and depositing a gummy mass of flour on the second break roll. Other maintenance work is done as much as possible while the mill is in

(*Turn to page 43*)



Next Month's Question

Plant clean-up activities are among the most necessary operations in a food plant. Unless cleanliness is maintained, trouble is sure to come. So some one must be responsible for clean-up. Where do you put this responsibility Is it the duty of the plant janitor force, of the department foremen or foreladies, or do you have a special production area cleaning force? And why did you choose the method you use?

Control For Small Plant *Gives Lower Cost*

The Plant NOTEBOOK

ECONOMICAL automatic plant control as it is known today, would hardly be possible without a recording device of some kind. With it, a proper analysis of conditions can be made at any time during the operating period. Recorder charts many times give immediate identity to troubles that would be difficult to locate without them.

Automatic operation of some services has become a necessity in plants where constant temperatures are needed throughout the 24-hour period and the plant manufacturing operation takes only a part of the day.

What was recently done at the Burlingame, Calif., plant of Borden Dairy Delivery Co., shows the results that can be obtained with modern control equipment. This plant handles about 1,500 gal. of milk per day, with a capacity twice as great. The control which I will describe is in the refrigerating end of the plant, which consists of two 6x6 in., two cylinder vertical single-acting high-speed ammonia compressors. These are driven by V-belts from 15 hp. motors. All necessary pumps and auxiliaries are included in the installation.

All electric power is purchased. As the cost of water metered from the city mains is high, a cooling tower is used. Also, the ammonia condenser water and milk cooler water section cooling water is recirculated.

Refrigerating service is supplied to a milk storage room held at 36 deg. F., an ice cream storage room held at —15 deg. F., and a flooded ammonia milk cooler which cools, with the aid of a water section, from 143 to 34 deg. F. at the rate of 6,500 lb. of milk per hour.

One ammonia compressor and one condenser pump are used as a unit for holding room service. Control is by thermostats. A rise in either, or both, the milk room or ice cream room temperature starts the compressor. Also, these controls stop the operation when the temperature is brought down again to the correct level. These room controls each operate on a 2 deg. range, but the controls are independent of each other.

To protect the system against abnormal operation, a high pressure hand reset cut out mercury switch is installed on the discharge line. This protects against water failure or overpressure. Also, a low pressure automatic reset cut

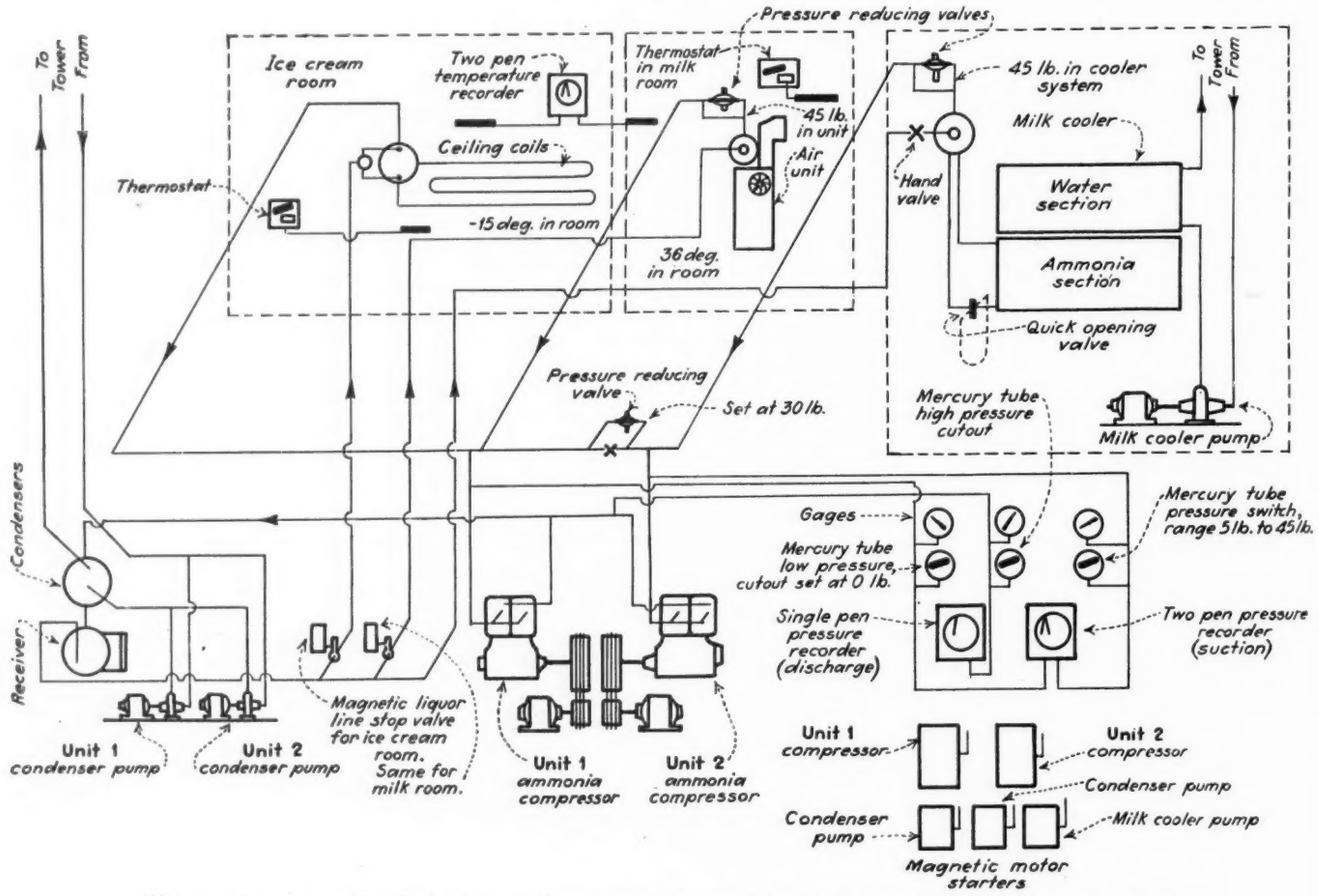


Diagram of control system that has towered costs and given good results in a small milk and ice cream plant.

out mercury switch is installed on the suction line. This protects against vacuum operation from clogged ammonia liquor lines, faulty float valves, or blown fuses on magnetic valves. These switches are wired in series ahead of the mercury switches which are actuated by the thermostatic bulbs in the cold rooms.

In operation, when the ice cream room temperature rises 2 deg. F. above normal, the thermostat closes a circuit which energizes the coil on a magnetic stop valve. This valve is on the liquor line from the ammonia receiver in the engine room to the float valve which controls the level of liquid ammonia in the surge drum in the ice cream room, which in turn feeds the ceiling coils. When the coil of the valve is energized, a pilot switch makes contact. This closes the circuit of the condenser water pump motor switch holding coil. This, in turn, closes the circuit of the compressor motor switch holding coil. All motors are across the line starting type.

When the room temperature drops to normal, the thermostat opens the control circuit and the system shuts down.

The milk room control circuit is the same and is wired in parallel, so that when one room still needs refrigeration, though the other is ready to shut down, the system continues to operate until both rooms are ready. The thermostat controlling the room where the temperature is correct, only closes the liquor valve to that room. The system continues to operate until the other room temperature is correct.

The milk room is cooled by a unit cooler, with the liquor stop valve controlling the flow to the surge drum float on the unit. The blower on this unit runs all the time, preventing frosting of the coils.

When desired, the entire refrigerating system can be operated manually. When manual operation is used, the high and low pressure cut outs protect the system against abnormal conditions.

THE OTHER AMMONIA COMPRESSOR and condenser pump unit is used for the milk cooler. This is of the full flooded type, having a surge drum with float controlled liquor level. Quick opening valves are installed on the thermosyphon circulating lines from the surge drum to the cooler coils. Operation is automatic, except for mutual opening and closing of the liquor supply valve and the quick opening valve on the suction line to the surge drum.

When the milk plant operator is ready to start the cooling, he opens the liquor line valve to the float on the cooler. He also opens the valve on the line from the bottom of the cooler to the surge drum. This starts a natural circulation of ammonia through the cooler and the pressure in the cooler rises. When it reaches 45 lb., a mercury switch closes an electric relay switch. This closes the holding coil circuit on the condenser water pump motor starter, which in turn starts the compressor and the milk cooler water tower pump.

The unit continues to run until the pressure reaches 5 lb. Then the mercury switch opens the circuit and closes down the three motors. This cycle continues as long as the cooling period lasts.

The compressor speed is such that the proper capacity is obtained at full cooling load to keep the compressor running nearly continuously. The milk temperature is controlled by the ammonia temperature in the cooler, which depends upon the pressure. This pressure is controlled by a pressure reducing valve on the cooler.

When the cooling period is over, the operator closes the liquor supply valve and the quick acting valve on the circulating pipe of the cooler. The machine pumps the pressure down and stops.

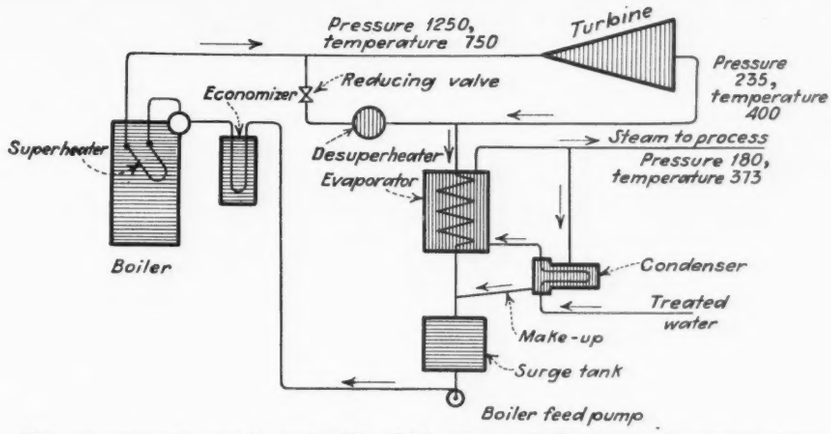
However, to take care of the pressure rise caused by room temperature and by washing the cooler, a ½ in. pressure reducing valve is installed between the two ammonia systems. This is set at 30 lb. Any rise above 30 lb. pressure in the milk cooling system flows into the lower pressure suction lines of the room circuit. This prevents starting, rapid pump out and stopping of the milk cooler compressor.

The high pressure cut out of the first system also controls the second unit. A control switch from automatic to manual, cuts out all the automatic features.

Pressure recorders on both suction systems, and on the high pressure side, give a continuous record of conditions and clearly show results. A study of the recorder charts under normal operation gives clues that readily permit any unusual conditions to be remedied, and suggest the best procedure for improving operations as to pressures and compressor speeds.

Temperature recorders in the rooms have an equal value.

This set up operates very efficiently. It gives low unit costs, with dependable service.—RAY B. WOLF, *San Francisco, Calif.*



How an evaporator can be used with a high pressure boiler to supply process steam and power at high efficiency.

Evaporators in Food Industry Power Plants

THE TREND to boiler pressures as high as 600 to 1,200 lb. has been reflected from the central station field into the industrial power plant. This brings a new problem, that of feed water. A high pressure, high temperature, high rating boiler must have clear water. And that means that the feed water should be condensate.

Since central station generating stations operate on a closed system, the only raw water is that used for make-up, some 2 or 3 per cent. This is too much for the system to tolerate, but since the amount is small, it can be evaporated at little cost.

In the food industries, however, the reverse is true. When the quantity of water to be evaporated is small, the vapor from the evaporator is condensed in heating the feed water. But if most of the feed water is to be evaporated, the disposal of the vapor in this way is not practical. However, in most food plant power installations, a large quantity of process steam is required. This must be clean. Therefore, the evaporator achieves a double purpose, for the vapor from the evaporator is used as process steam, instead of being condensed. In this way, both boiler and process are applied with clean water.

In the accompanying diagram is shown the layout of such an installation, recently put into service. The high pressure steam passes first through the turbine, then through the evaporator, where it is condensed and returns to the boiler as feed water. Raw

water is evaporated into clean process steam in the evaporator. After use in process heating, the clean condensate from the process operations supplies the make up water for the boiler feed.

Referring again to the diagram, it will be noted that the steam leaves the boiler at 1,250 lb. pressure and 750 deg. F. temperature. That means that the steam has 1,345 heat units per lb. Leaving the turbine at 235 lb. pressure and 400 deg. F. temperature, it has 1,205 heat units per lb. Hence the turbine extracts 140 B.t.u. per lb. of steam passing through it. Since this is a 10,000 kw. turbine, using 300,000 lb. of steam per hour, or 30 lb. per kw.-hr., it uses 4,200 B.t.u. per kw.-hr. This corresponds to an efficiency of 81 per cent.

Such an efficiency is about double the best central station practice.—N. T. PEF., *Chicago, Ill.*

The Plant NOTEBOOK

Minor Repairs Often Pay

Ice cream can hooks with double and single-claw ends can be restored to perfect shape by bronze welding a soft steel tongue in place of the broken tongue or tongues, after dressing the sides of the hook body to receive the new piece or pieces. The double end of the hook shown in the picture between two cans is the repaired end.

Another good trick in ice cream service is to bronze weld a piece of $\frac{3}{8}$ in. brass pipe to a dipper body for a handle. Then close the pipe end round with the torch. This repair is more satisfactory in every way than the original wooden handle which, after coming loose never stays on, and is less sanitary.

A repaired dipper is shown lying near the ice cream cans.—CARL RICHARDS, *Chicago, Ill.*

Repaired can hook and ice cream dipper.

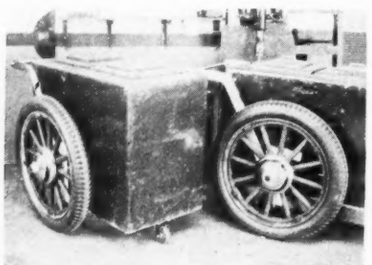
Special Delivery Hand Trucks

To make deliveries in the exposition grounds during show hours when big trucks were prohibited, we had to develop the hand trucks shown.

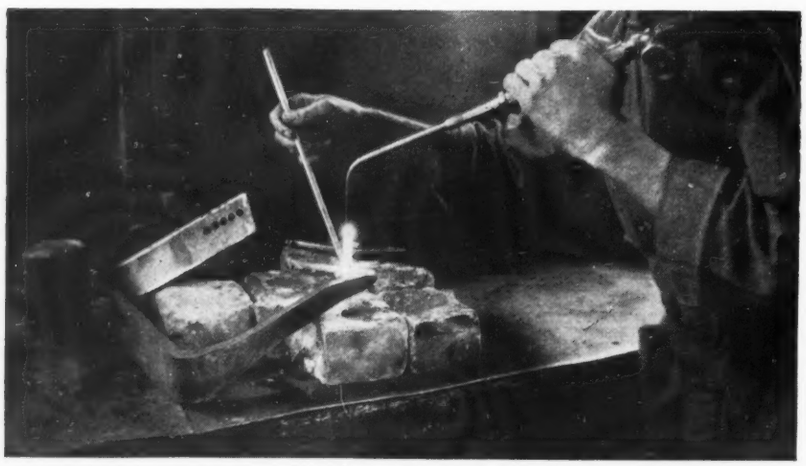
Heavily insulated cabinets were chosen for the job. These were mounted on underslung axles made of 1x2-in. channel iron and welded to the wheel knuckles. The handle supports are made of $\frac{1}{4}$x1$\frac{1}{2}$-in. soft steel screwed to the cabinet. Nickled handle bars were used. The front ends rest on swivel castors.

With new tires and special hub caps the appearance was very good. Using the trucks, deliveries could be made from the supply station to the farthest point of the exposition grounds.

Hages, Ltd., had three of these in use during the show.—BILLIE BURGAN, *San Diego, Calif.*



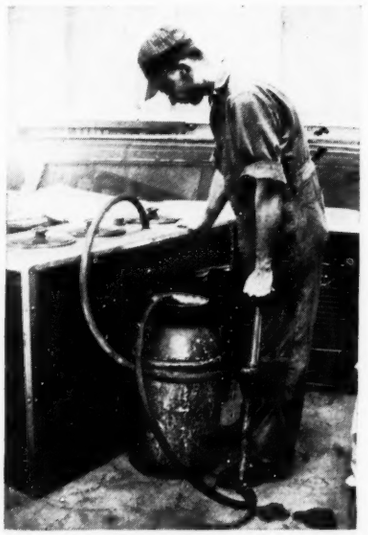
Special delivery hand trucks.



Hard-surfacing worn part.

Filling Cabinets With Brine

Filling electric refrigerated ice cream cabinets with brine can be made as easy as this picture shows. This is done by using a small double-action bilge pump. To remove the brine you simply reverse the hoses.



Filling electric ice cream cabinets with brine by using a bilge pump.

Compare this with other methods such as pouring the brine into a funnel out of a heavy bucket or can. Or using a plug-in electric pump, conducive to electric shock on account of dampness. Or putting in the brine with a hand water tank pump.

During the seasonal changes of ice cream cabinets this idea has proved to be not only a time saver but also a back saver.—BILLIE BURGAN, *San Diego, Calif.*

Hard Surfacing Eliminates Repairs

Parts that wear out quickly through scraping on concrete floors or other abrasive surfaces, can be quickly, and almost permanently, repaired.

For example, the picture shows such a repair being made on the underside of a clamp truck claw. This was removed from a hand truck used for handling cases. It had become worn from contact with the floor.

The repair was made by hard-surfacing with Haynes Stellite. Previously repairs had to be made once a month. The hard surfaced claws have now been used for seven months, without showing wear.—JIM BRADFORD, *St. Louis, Mo.*

New DISCOVERIES AND INVENTIONS

FATS AND OILS

Salad Oil From Tobacco!

TOBACCO SEED OIL, which contains not the slightest trace of nicotine or any other harmful substance, has been strangely neglected as an edible and industrial oil. In its unrefined state the oil is useful in making varnishes and soaps. Refined tobacco seed oil is bland and has been pronounced fully equal to peanut oil as a salad oil. The press cake from the oil mill contains about 35 per cent crude protein and is useful for feeding cattle, so that it provides a valuable by-product. Like the oil it does not contain any poisonous substance such as nicotine.

The yield of tobacco seed may be as much as 900 lb. per acre, giving about 300 lb. of oil and 600 lb. of press cake. Tobacco seed is about as rich in oil as flax seed or rape seed. Soy beans yield only about half as much oil. It is considered unfortunate that the oil is not more widely utilized, especially as an edible oil.

Digest from "Tobacco Seed Oil in Food Products and in Varnishes," by P. Koenig, *Matieres Grasses*, 28, 10862, 1936. (Published in France.)

Source of Flavor In Peanut Oil

FOLLOWING THE PREVIOUS DISCOVERY that olive oil contains an extremely small quantity of a substance with intolerably bad taste, a similar study was made of peanut oil. Raw peanut oil gave a greater residue than olive oil, not because it was more highly contaminated but because separation is more difficult and the residue holds more of the oil in itself. About 25 lb. of final residue, separated from oil, was obtained from some 5,500 lb. of raw peanut oil. This residue yielded less than an ounce of a pale yellow liquid with intensely disagreeable odor and overpoweringly acrid, nauseating taste.

From comparison of the bland taste of the refined oil with the characteristic flavor of the raw oil it seems that the hitherto unknown yellow liquid gives peanut oil its bouquet. Like other edible products with a characteristic flavor, peanut oil is either well liked or detested according to individual tastes. It is believed that the bouquet imparted by the newly discovered bitter principle is responsible for this sharp division between like and dislike among users of peanut oil.

Digest from "Hydrocarbons in Peanut Oil," by Henri Marcelet, *Bulletin de la Societe Chimique*, series 5, vol. 3, 2055, 1936. (Published in France.)

Improved Protein Extraction

OUT OF RUSSIA comes news of a better method for recovering proteins from soy beans and castor beans. The process is used at a mill at Zaratov. After removing the oil from the crushed seeds, the cake is extracted with a mixture of milk of lime and caustic soda in water. The process is an improvement over other methods because the steaming of the seed cake before extraction is done in vacuum. Live steam is injurious to the heat-sensitive proteins, and vacuum steaming raises the temperature only to about 158-165 deg. F. instead of 221-230 deg. F. as with live steam.

After leaching out the protein, the alkaline liquor is neutralized with hydrochloric acid in precipitation vats, and the slurry of precipitated protein is filtered. The charge in one leaching vat should not be more than about 1,300 lb. With larger quantities, the protein solution becomes difficult to handle properly. The residue from making soy bean protein is useful for cattle feed. But the castor bean residue is not suitable for feed and is used for fertilizer.

Digest from "Recovery of Vegetable Proteins in Russia," by D. Talantzev and D. Gilman. *Chemische Apparatur* 23, 94, 1936. (Published in Germany.)

BEVERAGES

How to Clarify Wine

THERE ARE three weapons for combating cloudiness in wine. These include the addition of protective colloids, heat treatment and ultrafiltration. And then a fourth might be mentioned. It involves the utilization of protective colloids, such as tannins, which may be naturally present in the beverage.

Protective colloids are substances like gelatine, dextrin or gum arabic. These serve to keep liquids clear by preventing the precipitation of matter in solution. In wines, the problem of cloudiness is complicated and has no single, simple answer because there are many causes. Gelatine, dextrin or gum arabic may help or hinder, according to circumstances.

Ultrafiltration is a modern expedient which helps to control cloudiness. When colloids, whether naturally present or artificially added, are a hindrance rather than a help, they can be filtered out along with any particles which may be clouding the wine. An ultrafilter uses a filter membrane which, to all appearances, has no holes and would not allow a liquid to pass through it. Transparent cellulose, for example, can be used in this way for some ultrafiltration purposes.

In the heat treatment of wine to prevent clouding, the temperature used depends on the kind of wine, the type of cloudiness and the kind and amount of colloids present. The heat method is especially applicable to red and white wines, in which it has effects quite similar to those brought about by adding gum arabic.

Digest from "Colloidal Phenomena in Wines," by J. Riberean-Gayon. *Bulletin de la Societe Chimique* (Series 5), 3, 603, 1936. (Published in France.)

Centrifugal Force Aids Gas Removal From Liquids

USE OF CENTRIFUGAL FORCE as an aid in the removal of gases from liquids is the subject of U. S. Patent No. 2,060,242.

Specific reference is made to its application in the de-aeration of fruit juices which develop "off-flavors," deteriorate in vitamin content and cause corrosion of metal containers in the presence of oxygen. Removal of as much as 86 per cent of residual gas in fruit juices is claimed for this procedure worked out by George N. Pulley, Winter Haven, Fla., and dedicated to the

free use of the people of the U.S.A.

The equipment used is a cylindrical tank of non-corrosive material built to withstand a vacuum of 29 in. and fitted with a rotatable shaft carrying a saucer-shaped disk, an air tight cover and packing glands, a means of producing a vacuum, a nozzle inlet for the liquid, and a means for collecting the de-aerated product.

As the liquid at about 85 deg. F. strikes this disk revolving at 1700 r.p.m., it is thrown out through holes in the rim of the disk as a mist with all the gas bubbles broken up by the shearing action. Under a vacuum of 28 to 29 in. of mercury the gases are sucked off and the liquids run down the walls of the tank to be drawn off into a container.

DAIRY PRODUCTS

Effect of Freezing Sweetened Condensed Milk

THE EFFECTS OF EXTREME COLD on sweetened condensed milk have been studied in Russia, where warehouses can be really cold. Specimens of condensed milk containing 38 per cent cane sugar and 29 per cent water were stored two months at 10 deg. F. (It froze at about 6 deg. F.) Aside from a slight crystallization of the milk sugar there was no noticeable change in the product. The cane sugar did not crystallize and there was no change in consistency. These experiments indicate that severe winter cold is not harmful to sweetened condensed milk, so long as the containers are not damaged.

Digest from "Effects of Low Temperatures on Sweetened Condensed Milk" by A. Yu. Pikman, *Konservnaya Promuishlennost*, 34, No. 3, 1936. (Published in Russia.)

Traces of Copper Interfere With Storch Test for Raw Milk

THE STORCH TEST, which is much used to ascertain whether milk has been pasteurized or not, depends on a color reaction which is given by raw milk. It is so sensitive that it will detect the addition of as little as 1 per cent of raw milk to properly pasteurized milk. It is known that the heat of pasteurization destroys an enzyme in raw milk which is responsible for the color, and so the test is usually considered reliable. But there have been well substantiated complaints that rejections on the basis of the test were improper and so it was necessary to seek a reason.

Two possible reasons were found, though there is only one which might be encountered in actual dairy practice. One was the presence of chloride of lime in the milk, which would never happen in any well regulated dairy. The other was the presence of copper, in such infinitesimal traces that when milk is pasteurized in copper containers it can take up enough of the metal to give a false test. It is therefore considered probable that copper in the milk was responsible for the rejections of milk known to have been properly pasteurized.

Seeking a means to safeguard the producer from improper rejections, it was found that if a little potassium cyanide is added to the sample (*NOT* **to any milk other than the sample!**) the test is again reliable, even with milk containing more copper than could possibly get into it from copper containers.

Digest from "The Storch Test," by L. C. Janse, *Chemisch Weekblad* 33, 638-640, 1936. (Published in Holland.)

Time Savers to Busy Men

EVERY ITEM HERE represents roughly an hour of intense technical reading, even if the original publication is in English. In a foreign tongue it takes longer. First the original has to be read or translated. Next the abstractor has to decide what it really means. Sometimes that takes another hour. Then it has to be written in simple, readable English.

N.B. *Do you want more than four pages per month of these digests?*—THE EDITORS.

Better Way to Test Total Solids In Milk

AS FAR BACK AS 1883 it has been "known" that the specific gravity of milk increases on standing. And then there is some other old scientific folklore such as: night's milk is more dense than morning's milk; or winter's milk is more dense than summer's. Such curiosities as these have perplexed many and have caused much trouble, because a quick way to get at the total solids in a milk ought to be possible by adding the fat test to a calculation based on the specific gravity of the milk. The failure of such a method to be accurate seems to arise from the fact that nobody has ever controlled the effect of previous temperatures on specific gravity readings. If the milk to be tested is first warmed to 45 deg. C. for one-half minute to melt the butterfat, then cooled to 30 deg. C. and promptly tested for specific gravity at this temperature, while the fat is still liquid, the tests really mean something. Also they can be duplicated.

The following equation will now apply for calculating the total solids from the fat content and the specific gravity.

$$\text{Total Solids} = 1.2537\ \text{Fat} + 0.2680\left(\frac{\text{Lactometer reading}}{\text{Sp. gr. of milk}}\right)$$

In 421 comparisons between this method and the tedious drying method the maximum variation was never over 0.30 per cent.

The specific gravity determination must be accurate to the fifth decimal place, and the lactometer itself must be calibrated before using.

Digest from "The Influence of the Physical State of the Fat on the Calculation of Solids from the Specific Gravity of Milk." By Paul F. Sharp and Ray G. Hart. *Journal of Dairy Science*, 19, 683, 1936.

"Oxidized" Flavor in Milk

WHAT REALLY TAKES PLACE in milk when it takes on the so-called "oxidized" flavor has long been under investigation. It is known that minute amounts of copper will usually cause this flavor change. In this research, however, even when copper in measured amounts was added to the milk, the "oxidized" flavor did not always develop. The difference depended on the mechanical manipulations given to the milk. When the milk, with or without added copper, was first pasteurized and then homogenized at 3000 lb. pressure or higher, there occurred no "oxidized" flavor.

Prolonged agitation at low temperatures, or freezing and thawing instead of homogenizing had the effect of partially counteracting the susceptibility to take on the "oxidized" flavor—but did not completely prevent it.

From these observations the authors carefully suggest that lecithin in the milk and not the butterfat is what is affected when this off-flavor develops.

Digest from "Oxidized Flavor in Milk. II. The effects of homogenization, agitation and freezing of milk on its subsequent susceptibility to oxidized flavor development." By Thurston, Brown and Dustman. *Journal of Dairy Science*, 19, 671, 1936.

CANNED FOODS

Steam Sterilization of Solid Foods in Cans

COOKING OR STERILIZING of dry solid foods in cans by steam is now possible according to U. S. Patent No. 2,060,736 granted November 10 to David L. Loetscher, Flushing, N. Y.

Examples of these foods are string beans, apple slices, grape fruit sections, berries and the like. Difficulties which had to be overcome were tied up with getting the steam into intimate contact with all portions of the food in the containers without collection of condensate in the container. Retention of color and nutritient values as well as of

physical form and appearance is the argument in favor of "dry" cooking or sterilization of the solid foods exemplified by those mentioned.

As disclosed in this patent, assigned to the Crown Cork and Seal Co., Inc., New York, N. Y., this type of cooking or sterilization is possible through shooting steam under pressure into the filled container in an inverted position on a perforated plate. As might be suspected the real trick lies in the mechanical handling of the filled container to get the steam to all parts of its contents, to put it in an inverted position, to drain off steam condensate, to return it to upright position, and seal it.

Temperatures ranging from 150 to 212 deg. F. are obtainable in 1 to 2½ min. in the open mouth cans. If vacuum is to be applied or cooking temperatures of 240 to 260 deg. F. are desired, provision is made for the use of the valve-top covered by U. S. Patent No. 1,728,533.

When Snap Beans Are At Their Best

WHEN snap bean pods were fifteen days old, measured from the date of flowering, they were best for canning purposes. At this stage they were full length but the seed had developed so little as to be insignificant compared to the total weight of the pod. Fairly good results could be obtained, however, by canning pods ten to twenty days old, but they were best at fifteen days.

For table use, on the other hand, the best stage was when the beans were 20 to 25 days old from the date of flowering; although they were an acceptable product all the way from 10 to 25 days old.

Digest from "Effect of Stage of Maturity of the Snap Bean on Its Composition and Use as a Food Product," by C. W. Culpepper, *Food Research*, 1, 357, 1936.

Tin in Canned Vegetables and Fruits

THE AMOUNT of tin dissolved from can linings by fruit or vegetable juices depends, above all else, on the acidity of the juice. If the canned food contains fats less tin is dissolved; but there does not seem to be any direct numerical relation between the amount of fat and the extent of the attack on the can lining. Canned tomatoes, even if sterilized only a short time, rank high in amount of dissolved tin. In canned fruits the skin seems to serve as a protection from corrosion of tin plate; hence peeled fruits dissolve more tin than unpeeled. Stored canned foods should be kept cool; at about 98 deg. F. (blood heat) corrosion of the can lining is greater than at about 77 deg. F. (moderately warm room temperature); it may be more than doubled by this relatively small temperature increase. This investigation was made in one of the Russian food laboratories.

Digest from "Tin Content of Canned Foods," by Ya. L. Portnon, *Konservnaya Promuishlennost*, April, p. 16, 1936.

BAKERY PRODUCTS

Little Vitamin D in Flour

THERE IS slightly less than one part of ergosterol in a million parts of wheat flour after the first grinding, while a highly refined flour will contain only about three parts per million. Moreover, the ergosterol found in the flour is not the type which readily forms vitamin D. All of which leads to the presumption that wheat flour is not useful in curing or preventing rickets.

These findings were not made through feeding tests with mice and rats. While very reliable, this method is quite tedious. So an ingenious and rapid test was employed to obtain an advance estimate of the amount of ergosterol present. A spectroscope with camera attachment and a photoelectric cell, or electric eye, were utilized.

It is expected that animal feeding tests will confirm the findings of the instruments, indicating that those in search of vitamin D must look for it elsewhere than in wheat flour.

Digest from "Sterols in Wheat Flour," by A. Dangoumau. *Bulletin de la Societe Chimique* (Series 5) 3, 988, 1936. (Published in France.)

Yeast Grown in Closed System

CIRCULATION of nutrient wort containing propagating yeast cells is the new and novel feature in yeast growing covered in U. S. Patent No. 2,056,576 granted Oct. 6 to Sigurd Jansen, Oslo, Norway.

The manner in which the circulation is carried out has an important bearing on the economy of the process. Requisites are that the circulation be vigorous enough to cause violent agitation of main body of wort and that air be entrapped in the circulating wort to support the propagation of yeast cells. Abundance of air means increased yield of yeast.

A portion of the agitation is obtained by drawing yeast-containing wort from near the bottom of the propagating vat and forcing it back into the vat at near the same level. This auxiliary circulation is obtained with the aid of a centrifugal pump set in the system so that it sucks the wort from one side of the vat and drives it in at the opposite side. A partition extending part way up in the vat gives a turbulent motion to the body of the wort.

Primary circulation and aeration is accomplished by drawing yeast-seeded wort from near the bottom of the vat and returning it to the upper part above the surface of its wort contents. This circulated wort is returned as a spray or by flowing over baffles so as to contact with the air in the head space of the vat.

Capacity of each of the centrifugal pumps to carry out the circulation should be great enough to change the initial content of the vat every 7 minutes and 40 seconds. This content is, for example, 18 deg. Balling purified molasses and water to make approximately 400 gal. of a 1.3 deg. Balling solution at 30 deg. C. To this solution is added the seed yeast. During the thirteen-hour fermentation or propagation period a wort of molasses, water, and nutrient salts is added periodically to the circulating wort. The final volume of approximately 650 gal. should completely circulate every 12 minutes 40 seconds.

Closed system yeast growing differs from open system growing largely in manner of aeration and disposal of alcohol. In the open system great volumes of air are blown through the wort from the bottom of vats with resultant driving off of the alcohol formed.

In the closed system the air is sucked into the head space of the vat through top of vat; is forced in through perforated pipes below the wort spray jets; or is blown through distribution pipes under the baffles or wort spreading plates. Also the alcohol content is retained and recoverable through distillation.

Alcohol formation is reduced and yeast production increased by increased circulation of air in vat head space, by increased dilution of wort, by heavy seeding, and by using high speed pumps.

Centrifugal pumps of the axial type and having velocities of 600 to 1,500 r.p.m. give best results. Pumps having less than 300 r.p.m. should not be utilized.

Yeast produced is claimed to be equal to the open system yeast in gas production, flavor development, and keeping qualities.

Active Soybeans Destroy Vitamin A

LEGUME SEEDS, particularly soybeans, improve the color of the crumb of the loaf of bread when used in suitable proportions. The bleaching action is due to an oxidation of the carotene in the flour, but if the soybeans are heated above 50 deg. C. they are inactivated and no longer possess this property. It has been found that the vitamin A potency is also destroyed by this oxidation of carotene. And furthermore, the active soybean can destroy at least 99 per cent of the vitamin A in cod liver oil.

Digest from "The Effect of Active Soybean on Vitamin A," by Frey, Schultz and Light, *Industrial and Engineering Chemistry*, 28, 1254, 1936.

SUGAR

Lump Sugar

THE DIRECT (TEATINI) PROCESS for making refined sugar from massecuite is favored in some European beet sugar refineries. The recent development of a new, efficient furnace for generating an ample supply of sulfur dioxide at a moderate cost has given the process a new impetus. Relying largely on simplicity in equipment and operations for production economies, Teatini's system is particularly attractive for quantity output of lump sugar.

Unlike other systems, such as the compression method and the Adant process, the boiled sugar is fed directly into the centrifuge containing lump molds. A simple but efficient mold is used which holds 120 lumps in a frame with one removable side. The porosity and hardness of the lumps can be controlled according to the standards which may be selected to meet consumer demand. The lumps are dried and cooled by the time the centrifuge is stopped, centrifugal force being aided by a well directed current of air. After opening the molds the loose lumps are passed through a small mechanical sorter which arranges them all in the proper position for the wraping machine. The Teatini system was initiated by the Grand Pont de Hougaerde refinery in Belgium, but because of its unprecedented simplicity a number of other installations are being built in other parts of Europe.

Digest from "Recent Scientific and Technical Advances in the Sugar Industry," by Dario Teatini, *Chimica e l'Industria*, 18, 501–510. 1936. (Published in Italy.)

Peculiarities of Viscosity of Sugar Syrups

SUGAR SYRUPS (supersaturated solutions of pure cane sugar in water) have a peculiar viscosity behavior which is not ordinarily found in water solutions. The most striking feature is that when a syrup is heated, for example from room temperature up to about 165 deg. F., the syrup is more viscous immediately after cooling back to room temperature than it is an hour or two later. Both the actual viscosity and the difference after standing a few hours depend, of course, on whether a heavy or a light syrup is being tested. But a freshly cooled syrup may be found to be much more viscous than the same syrup will be after it has stood a few hours.

This is illustrated by a test case in which a syrup was cooled from 167 deg. F. to 58 deg. F. and its viscosity was then immediately measured; it was 36.1 on the viscometric scale selected for the investigation. But two hours later, and again three hours later, its viscosity on the same scale was only 22.0, a drop of more than a third. This was a heavy syrup, containing 75 parts of pure cane sugar in 25 parts of water.

The theoretical basis for this peculiar "aging" effect is not important for practical purposes, but the findings suggest the possibility of increased power consumption if a syrup batch goes to a mechanical stirrer immediately after cooling instead of standing a couple of hours. The same experiments brought out another viscosity effect which is even more peculiar, but with a much smaller change. It was found that mere stirring will raise the viscosity of a syrup perhaps 2 or 3 points (same scale as above); and here again the syrup must stand a few hours before it regains its original lower viscosity. The investigation was made in the Laboratory of Technical Botany, Delft, Holland.

Digest from "Observations on the Viscosity of Supersaturated Cane Sugar Solutions," by J. Coumou, *Chemisch Weekblad*, 33, 542, 1936 (Published in Holland.)

MISCELLANEOUS

Explosives from Licorice

IT HAS taken Italian chemists, struggling to make their nation self-sufficient, to find that explosives and lacquer, are logical by-products of licorice manufacture. In preparing licorice extract, the fibrous residue of the root is left over in large quantities. This residue the Italian scientists converted into a high-grade cellulose for nitrocellulose. Then they proceeded to make the two principal commercial types of nitrocellulose, one for lacquers and the other for explosives such as guncotton and smokeless powder.

This story is more than just another item in the European struggle for self-sufficiency. It opens to cellulose chemists another path to pure cellulose, and it gives the food industries an object lesson in the exercise of ingenuity wherever there is a possibility for by-product utilization.

Digest from "Nitrocellulose from Licorice Root Residues," by Francesco Pisani, *Chimica e l'Industria* 18, 452. 1936. (Published in Italy.)

What Copper Can Do To Vitamin C

IN ANALYZING for ascorbic acid (Vitamin C) in the laboratory, the minute amount of copper occurring in distilled water made in copper stills is enough to speed up the destruction of the vitamin by oxidation. And it may cause serious errors in determining the amount of vitamin present. Furthermore, a very little iron will speed up the effect of minute traces of copper.

Yet, though plant tissues contain copper, it does not seem to be in a form that will effect the vitamin C as uncombined copper does.

Adding 2 per cent of metaphosphoric acid to the acid used to extract the ascorbic acid will protect the vitamin during the laboratory manipulations.

Digest from "Vitamin C in Vegetables. III. The Oxidation of Ascorbic Acid by Metallic Catalysts," by Mack and Kertesz, *Food Research* 1, 377, 1936.

Emulsifying Agent Prevents Spattering of Margarine

BY PUTTING FATTY OILS through their chemical paces in a particular manner some novel preparations have been made which are effective emulsifying agents in cake batter, shortenings and the like. As an additional appeal to housewives who would like to use margarine as a cooking fat, the new preparations serve to prevent the spattering which makes margarine objectionable.

The invention, as described in British Patent 452,138 (granted Nov. 12, 1936 to A. F. Burgess and assigned to Emulsol Corp.), consists in heating glycerol (obtained from fatty oils) in presence of an alkali to obtain polyglycerol. Two, three or more molecules of glycerol may combine with each other to form the polyglycerol. The final step in the process is to combine the polyglycerol with fatty acids, such as the acids which were originally combined with the glycerol. These may be derived from vegetable oils such as palm, coconut, cottonseed, linseed or corn oil or from animal oils or fats such as tallow, lard, whale oil or fish oils. If odorous oils are used the acids may be deodorized with steam, either before or after combining with polyglycerol.

Synthetic Fats from Paraffin

MANY TIMES in the past a bright future has been predicted for petroleum as a cheap raw material for the chemical synthesis of sundry products now provided only by nature; and not a few of these prophecies have included edible fats among the possibilities. Russia has vast stores of petroleum and has contributed materially to progress along this line. Russians have produced fatty acids from which edible fats could be synthesized, but their acids were much contaminated by other, unsuitable acids and the yield was poor. German chemists have carried the work further, developing a process which gives a 47 per cent yield of prime white fatty acids from paraffin wax. A new plant has been built to operate this process in Germany. The present object is to use the synthetic fatty acids for soap manufacture; but the remaining steps for converting the acids to edible fats are known in principle, and can be utilized when conditions promise to make the venture profitable.

Digest from "Fatty Acids From Paraffin." *Chemisch Weekblad (Rubriek voor Handel en Industrie)*, 33, 168, 1936. Published in Holland.)

What's New IN EQUIPMENT

Rotary Dryer for Foods

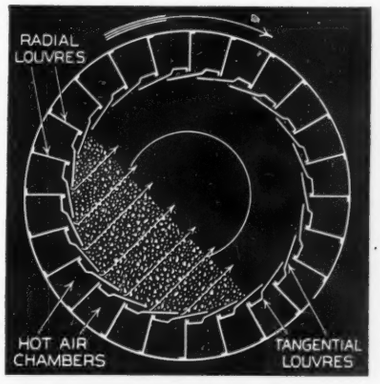
SOMETHING NEW in the way of dryers has been introduced into the United States by Link-Belt Co., 307 N. Michigan Ave., Chicago, Ill. It is called the "Rotary Louver Dryer" and originated with Dunford & Elliott (Sheffield) Ltd., London, England.

This dryer has been used in England with all sorts of granular, crystalline, and powdered materials. Among the food products dried with it are cocoa nibs, sago flour, vegetable waste, nuts, lemonade crystals, flaked grain, soaked wheat, bread crumbs, whole grain, flaked corn, coffee, corn germs, milk sugar, fish meals, molasses feeds, soy beans, starch, sugar, rice, and breakfast foods.

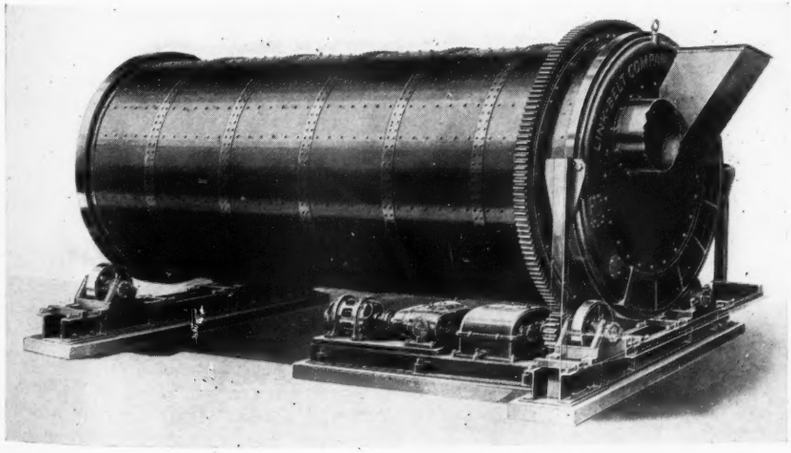
The machine consists of a mechanically rotated horizontal drum. In it are a series of channels near the circumference, into which hot air is blown by a fan, as shown in the accompanying cross-section. These air channels are covered by tangential plates which overlap in such a way as to leave a gap for hot air to pass into the material being dried. These plates also serve to prevent the material from falling into the air channels.

Air channels are tapered so as to give the inner cylindrical space of the drum a gentle slope from feed to discharge. As the drum revolves, fresh channels come beneath the charge of material. The air flow is arranged to enter only those channels lying directly under the charge. Hence, all the heated air must pass upward through the material.

It is claimed that the design of this dryer, combined with the mixing action caused by the rotation of the drum, causes the hot air to come into intimate contact with every particle of the material being dried. This is said to result in efficient heat transfer and uniform drying.



Cross-section of "Rotary Louver Dryer" showing air channels, tangential plates with louvers, and position of material being dried.



Exterior of new "Rotary Louver Dryer."

Retail Coffee Roaster

ROASTING coffee in the store before the consumer's eyes is one of the latest wrinkles in smart retailing. Equipment for this purpose was shown in FOOD INDUSTRIES, p. 437, Sept., 1936. Another roaster for the same purpose is

Electric coffee roaster for retail stores.

made by Yorktown Electric Roaster Manufacturing Corporation, York, Pa.

The device is housed in an ornamental metal cabinet, 34x34 in. and 52 in. high. It roasts either 5 or 10 lb. of coffee at a time, as desired. Operation is electric and automatic, with either intermittent or continuous feed, as desired. Green coffee is automatically admitted to the roasting chamber when the temperature reaches the correct point. When the roast reaches the right color, the batch is automatically discharged into a cooling hopper. Temperature and shade of roast are adjustable. A red signal light flashes when the roast is completed.

Confectionery Machine

JOHN WERNER & SONS, INC., Rochester, N. Y., are distributing a "boardless" printing, casting and cleaning machine, for the manufacture of fondant centers, crystallizing centers, grain work, and cast caramels. Its advantage lies in the fact that it prints,

casts and cleans without the use of starch trays.

It consists of an automatic starch printer, a depositing machine, and a starch buck, operated in synchronization, with an endless ribbon of starch which is automatically conditioned, cleaned and re-used without manual labor.

Use of this machine is said to give an improved product at less operating cost. It comes in capacities from 4,000 to 25,000 lb. per eight-hour day.

Air Cleaning Gun

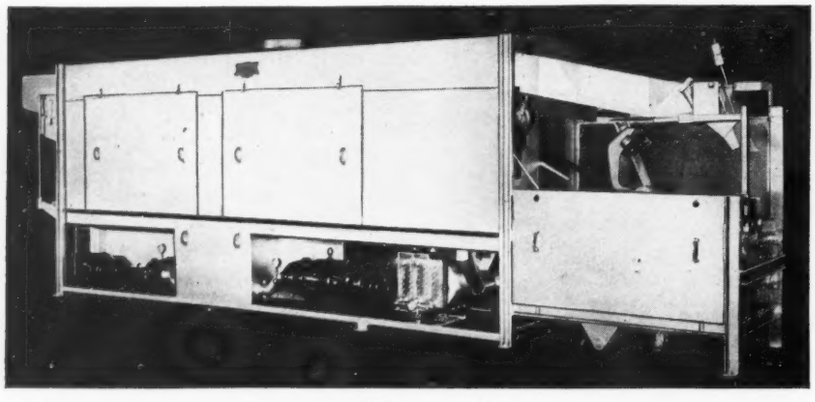
MOLDED SPECIALTIES CO., 4712 Chester Ave., Cleveland, Ohio, recently introduced an air gun for use in cleaning food plant and other equipment by air pressure. It is called the "Tri-Con." The design approximates that of a pistol, for easy aiming. The flow control mechanism, operating the valve by a trigger, is said to be fully responsive to the operator's touch, with easy pressure giving a range of air flow from minimum to maximum.

Barrel Draining Rack

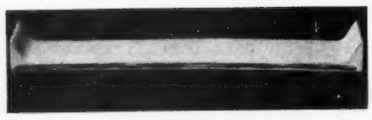
A DRAIN RACK which permits one man to place barrels or drums 24 in. above the floor for draining purposes, has been developed by Barrett-Cravens Co., 3255 West 30 St., Chicago, Ill. The rack is provided with an arc shaped rocker. While standing upright on end, the barrel or drum is inserted into the cradle of the rack. It can then be swung on the rocker, to a horizontal position, 2 ft. off the floor. An automatic lock holds the rack in draining position.

Milk Can Washer

CREAMERY PACKAGE MFG. Co., 1243 W. Washington Blvd., Chicago, Ill., announces a new milk can washer, called the "CP Washmaster." The machine is built in five sizes, for 6, 8, 10, 12 or 14 cans and covers per minute. It is claimed to wash more cans in less space than other washers of similar rated capacities.



Milk can washer.



Section of flanged conveyor belting for use in food plants.

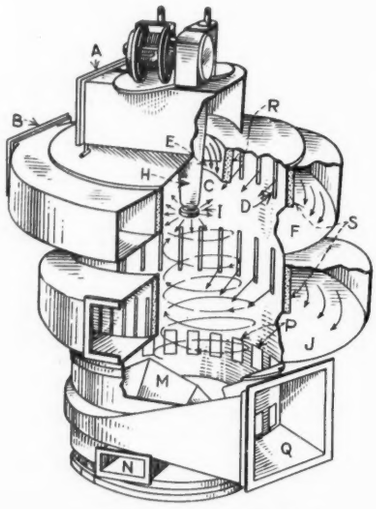
Food Conveyor Belting

WHEN HANDLING SMALL PRODUCTS, such as peas or berries, trouble often arises from spillage of the product onto the floor. Also, juices of fruits and vegetables often run onto floors from belts, causing loss and unsanitary conditions. To meet this difficulty, B. F. Goodrich Co., Akron, Ohio, is now producing flanged rubber conveyor belting, a piece of which is shown in the accompanying photograph. This provides a spill-proof conveyor which can be maintained in thoroughly sanitary condition.

Spray Drying Equipment

IMPROVED EQUIPMENT for spray drying, useful in the food industries for drying such products as milk and starch, has been developed by Bowen Research Corp., Garwood, N. J.

The new design of spray chamber is shown in the accompanying sketch. Reference to the letters on the drawing will indicate the operation. Heated air enters at *A* and *B*, through radial inlets *C* and *D*. Air from *C* is given a clockwise rotation by the passage *E*. Air entering through *B* passes through the manifold *F* to vertical inlet nozzles *D*, so arranged as to direct the flow just to the left of the axial center of the chamber. This gives, in combination with the air entering at *C*, a violent central vortex.



Spray drying chamber.

Material to be dried enters through the spray machine *H*. At the bottom of this is the homogenizing atomizer *I*. The spray discharges from *I* in a horizontal sheet, directly into the vortex of hot air.

Below the manifold *F*, is a manifold *J*, carrying cold air, to be used where cooling of the dried product must precede discharge.

Discharge is through *Q*, the solid particles being carried out through the openings *P* to *Q*. *M* is a rotating sweeper supplied with air through *N*. Any particles that reach the floor are swept upward by it, into the air stream again. Aluminum foil insulation is used, as shown at *R* and *S*.

The remainder of the new spray drying equipment includes centrifugal atomizing equipment, and a new closed type homogenizing atomizer.

Electrically Heated Kettle

A NEW line of electrically heated kettles for food plants is being marketed by Patterson Foundry & Machine Co., East Liverpool, Ohio. They may be had in gray cast iron, chemical iron, or any of various resistant alloys. Stirrers of

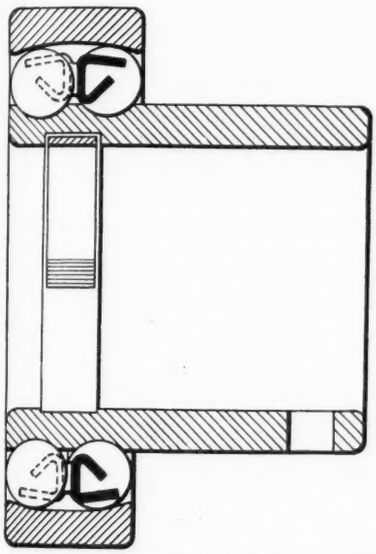
Electrically Heated Kettle.

various types, to suit the operation, are provided, powered by the Patterson "Unipower" motor drive, or belt driven. The size range is from 50 to 1,000 gal.

Anti-Friction Bearing

EASE of application without the use of tools is the feature of an anti-friction bearing now being manufactured by SKF Industries, Inc., 40 East 34th St., New York, N. Y.

In general, the bearing is similar to the SKF self-aligning extended inner race bearing. It has an eccentric groove



Anti-friction bearing that locks on shaft.

machined in the bore of the inner race. Fitted in the eccentric groove is a piece of spring steel called the "Grip-lock."

When this shoe is in the deepest part of the groove, the bearing slips easily onto the shaft. Then, by holding the inner race while the shaft turns in the direction of operation, knurling at the ends of the shoe grips the shaft. This causes the shoe to wedge in the shallow part of the eccentric groove, thus securely locking the bearing on the shaft.

Oil Cups

ALEMITE, a division of Stewart-Warner Corp., Chicago, Ill., is expanding its line to include oiling devices. First to be introduced are the "Thermal" oil cup and the "Microflow" oil cup. The "Thermal" is for use where a constant, slow flow of oil is desired. It operates by the expansion of air caused by the normal temperature increase in a running bearing. The "Microflow" is for a continuous flow of oil.

Process Equipment Control

STEAM HEATED PROCESS EQUIPMENT, including jacketed kettles and open or closed tanks, may be controlled by a device developed by Sarco Co., Inc., 183 Madison Ave., New York, N. Y. This is a temperature control valve, called a "Thermoton." It is intended to provide approximate temperature control by automatically varying the flow of steam to the heating coil or jacket.

The device consists of an orifice with an opening that is automatically

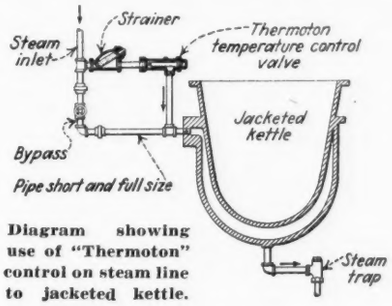


Diagram showing use of "Thermoton" control on steam line to jacketed kettle.

varied by the movement of a needle valve. The needle valve position depends upon the temperature of an expansible member to which it is attached. This, in turn, depends upon the volume of steam that is flowing. Adjustment is provided, so that the valve can be set to maintain any desired steam flow within its range.

In the sketch is shown the method of placing a "Thermoton" in the steam line to a jacketed kettle used for jam boiling.

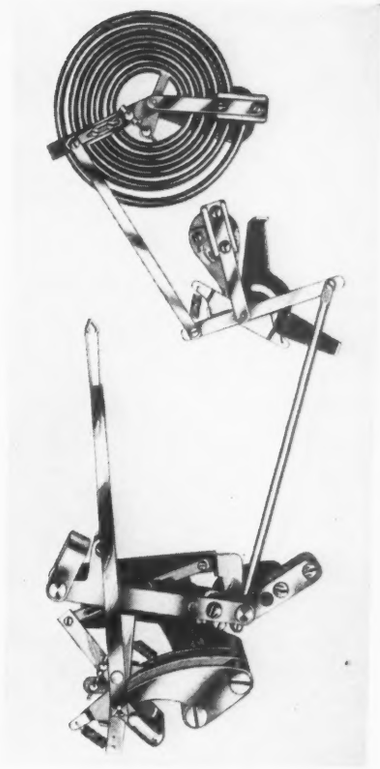
Automatic Compensator

THE FOXBORO COMPANY, Foxboro Mass., has developed an automatic pressure compensator for Foxboro flow meters. This mechanism is shown in the illustration. It is a simple spiral pressure tube connected to a lever.

As the line pressure changes, the spiral adjusts the multiplication of the linkage between the float and pen arm. This is not an additive correction but a percentage correction; the linear amount of correction differs at different points of the chart and is calibrated to fit the flow formula of the meter. Thus a continuous, instantaneous and accurate compensation for pressure changes is obtained automatically. The compensator is sensitive to, and will correct, the position of the flow pen for a change in pressure as small as 1/10 of 1 per cent.

At zero flow, pressure changes do not affect the position of the flow pen; at all other points on the chart the shift in pen position is just sufficient to compensate for the effect of this factor in the flow formula. On square-root flow scale meters the pen position is varied proportionately to the change in absolute pressure; on uniform flow scale meters, pen position is varied proportionately to the square root of change in absolute pressure. Should maximum flow and maximum pressure occur simultaneously, the pen will not travel beyond the upper chart limit.

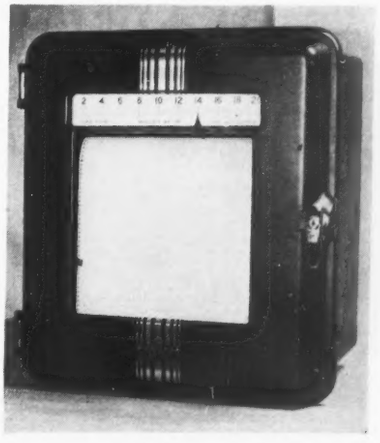
If at any time a pressure-compensating meter is changed over to a service where compensation is not required, the meter is easily adapted to the new service. The compensator does not affect the inclusion of pens for recording pressure or temperature.



Automatic pressure compensator for flow meters.

Recording Instruments

LEEDS & NORTHRUP Co., 4930 Stenton Ave., Philadelphia, Pa., are distributing a new model of the "Micromax" industrial recording instruments. The new line is an indicating and recording controller for temperature, CO_2, smoke, chemical strength, pH, frequency, and other variable, controllable factors. It provides indicating, recording, signalling and controlling in one device.



Micromax indicating, recording, and controlling instruments.

Just Off The Press

BOOKLETS • LITERATURE • BULLETINS

Food Plant Equipment

1. HEAT APPLICATION SYSTEM — Dow Chemical Co. General catalog of "Dowtherms", heat transfer systems employing diphenyl and diphenyloxide, or triphenyls, used in the heat processing of vegetable oils, food products and other materials.

2. HIGH SPEED MIXER—Read Machinery Co. A folder describes the "Ranger" high speed mixer for mixing and kneading bread doughs.

3. ICE MAKING EQUIPMENT — Flakice Corp. of New York. Bulletin No. 15 describes the advantages of "Flakice" in the cooling and preservation of foods, particularly those distributed direct to the consumer such as bottled milk and fresh produce.

4. ODOR ADSORBERS — Consolidated Air Conditioning Corp. An 8-page bulletin describing the application of odor adsorbers in air-conditioning systems and the savings effected by them in the amount of make-up air required.

5. REFRIGERATING EQUIPMENT— Carbondale Machine Corp. Bulletin 1104 describes absorption refrigerating systems, for use in plants having available a supply of exhaust steam.

6. STERILIZING LAMPS — Westinghouse Lamp Co. Information Bulletin No. 5 describes the Westinghouse "Sterilamp," a source of ultra-violet rays useful in sterilizing products of bakers, meat packers, and other food processors.

Plant Accessories and Supplies

7. AIR COMPRESSOR — Worthington Pump & Machinery Corp. Bulletin W-621-B1A, describes Type AN, steam operated air compressor of 21 cu. ft. per min. capacity at normal speed of 140 single strokes per minute.

8. AIR NOZZLES FOR CLEANING— The Lunkenheimer Co. Circular No. 533-A describes bronze air nozzles with renewable non-metallic disks, for 150 lb. pressure.

9. CENTRIFUGAL PUMPS—Worthington Pump & Machinery Corp. Bulletin W-318-B5A describes Type UB, two-stage volute pumps; Bulletin W-321-B9 describes "Monobloc" centrifugal pumps, Types DE, DF and DG.

10. DIESEL ENGINES — Ingersoll-Rand Co. Type S, vertical, four-cycle, single-action, solid injection diesel engines for grain mills and similar service, are described in a 24-page bulletin.

11. DIESEL ENGINES—Worthington Pump & Machinery Corp. Bulletin S-500-B22 describes the Type BB, direct injection, vertical four-cycle diesel engine for grain mills and similar installations.

12. ELECTRIC MOTORS—General Electric Co. A new design of squirrel cage, polyphase induction motors, from 1 to 15 hp., is described in a series of bulletins as follows: GEA-2345, GEA-1619B, GEA-1538A, GEA-1366A, GEA-1341C, and GEA-1326B.

13. EXTRACTION TURBINES — Allis-Chalmers Mfg. Co. Bulletin No. 1179 describes this company's design of condensing automatic extraction turbines for supplying process steam and power to industrial plants.

14. INSULATION — Johns - Manville Corp. The 1936 edition of this company's general catalog of industrial construction materials describes high and low temperature insulations for industrial plants. Also a 6-page brochure describes "Rock Cork" low temperature pipe insulation and its application.

15. MOTORS — Lincoln Electric Co. Folder of engineering information on the application, selection and installation of totally enclosed, fan cooled motors.

Packaging

16. PACKAGING MATERIAL — Engineering & Licensing Corp. (selling representatives for Sealkote Corp.) Two bulletins describing "Sealkote" and its applications in laminating and impregnating paper, to improve the protection given to packaged foods.

Trucks, Tractors and Accessories

17. DELIVERY TRUCKS — Chevrolet Motor Co. General illustrated catalog of ½-ton and 1½-ton motor trucks.

Control Equipment

18. CONTROL INSTRUMENTS — The Foxboro Co. Bulletin 194-1, a 20-page bulletin describing the "Potentiometer Stabilog," a temperature controller with automatic, full floating control.

19. CONTROL INSTRUMENTS—Brown Instrument Co. Catalog No. 8901 is a 32-page bulletin describing "Air-O-Line" air operated controllers for temperature, pressure, flow and liquid level.

20. RECORDING INSTRUMENTS—The Bristol Co. Bulletin No. 436 describes round chart, recording voltmeters and ammeters for the industrial plant.

Pest Control, Bacteria Control, and Sterilizers

21. PEST CONTROL—Vestal Chemical Laboratories, Inc. Bulletin describing "Vespra" and "Vesfume," products prepared for the elimination of insect infestation in cereal products, beans candy and dried fruits.

Laboratory Equipment

22. INSTRUMENTS—Julien P. Friez & Sons, Inc. Catalog of thermometers, psychrometers and other instruments used in air-conditioning surveys and for meteorological work.

G. L. Montgomery, Managing Editor, Food Industries, 330 W. 42nd St., New York, N. Y.

January, 1937

TO THE READER: Use this convenient form to order the bulletins you need.

Please obtain for me the bulletins indicated by the following numbers:.....

.....

Name.....

Title..... Address.....

Company.....

THEY'RE AFTER YOUR MARKET

Ads Sell More Sauce

SALES of "Ocean Spray" cranberry sauce were boosted 15 per cent in 6½ months. This large increase did not just happen. It was brought about by a national advertising campaign. The drive included full pages in color in *This Week Magazine* and *Christian Science Monitor*. Then black-and-white ads appeared in twenty newspapers with a total circulation of more than 6,000,000.

29 Years of Advertising

DOES ADVERTISING PAY? Well, everyone knows that it does, but here are some figures to show how much. During the 29 years of Sunkist advertising, per capita consumption of oranges in the United States and Canada increased from 31 to 78, that of lemons from 13 to 17. A total of $23,000,000 has been spent by California Fruit Growers' Exchange to help bring this increase about. The combined costs of marketing and advertising for the year just ended amounted to only 3.2 per cent of gross sales.

Latest in Food Stores

"BUY FOOD—NOT TINS" is the slogan of a new type of store entering the market picture of the food industries. One of these is in Seattle, Wash. Called a Liquiteria, it handles liquid foods and household necessities in bulk. Here are a few examples of the prices: corn and cane syrup, 55 cents a gallon; imported virgin olive oil, $2.25 a gallon; 40-grain cider vinegar, 23 cents a gallon; peanut butter, 17 and 19 cents a pound.

How Ice Cream Is Promoted

PROBABLY FEW FOOD PRODUCTS are more effectively promoted than ice cream. So other food manufacturers and distributors might well take some notice of how much the ice cream industry spends on advertising, the kinds of advertising employed and the type of appeal found effective. All this was covered in an analysis made by International Association of Ice Cream Manufacturers.

An average of 2.83 cents a gallon was spent in advertising ice cream during 1935, with most manufacturers reporting larger budgets in 1936. Most of this expenditure was for point-of-sale promotion, although almost as much went into newspaper ads. The following table shows how much of the advertising dollar was spent for the various mediums and also the number of manufacturers using those mediums.

Kind of advertising	Per cent of total advertising expenditure	Per cent of number of companies using
Point of sale (not analyzed)	22.3	73.0
Newspaper	19.0	84.3
Window display	8.9	61.8
Neon or electric signs	5.6	43.8
Billboard	5.3	46.1
Truck body	4.9	57.3
Fountain display	4.5	46.1
Radio	4.5	47.2
Curb signs	4.0	47.2
Local organization programs, publication, etc	3.8	60.7
Window painting	3.8	34.8
Specialty or novelty	2.5	27.0
Miscellaneous	2.3	16.9
Store front painting	2.0	23.6
Contribution of products	1.7	28.1
Direct by mail	1.5	21.3
Sampling	1.1	18.0
Consumer magazines distributed through dealers	0.7	10.1
Plant visits	0.5	11.2
Local dairy council	0.5	2.2
Hostess	0.3	7.9
Dietetic demonstration	0.2	6.7
Talks before clubs	0.1	3.4
National dairy council—less than 1%	0.1 of	3.4

In preparing their advertisements, 70 per cent of the ice cream manufacturers aimed at the consumers, 15 per cent primarily at the dealer, with the other 15 per cent paying equal attention to dealer and consumer. This picture differs from that for most food industries, because the dealer ordinarily handles only one brand of ice cream.

Quality appeal was the theme of most (20 per cent) of the ice cream ads and promotional material, with ice cream as a food coming second, refreshment third, health appeal fourth, and flavor fifth.

The planning and management of an advertising program bears a direct relation to its success, and 76 per cent of the manufacturers had a company officer devote part of his time to supervising expenditures. One-tenth of them placed this in the hands of an advertising manager, five per cent with an advertising agency, 3 per cent used an agency in cooperation with their own advertising department and 6 per cent employed the combined efforts of an agency and a company official.

Sales of ice cream, incidentally, were good in 1935 and even better last year.

Business Must Sell Itself

BUSINESS MEN were suddenly awakened on Nov. 3 to the fact that industry has not been selling itself to the public. As C. M. Chester, chairman of the board of General Foods Corp. and president of National Association of Manufacturers, so aptly put it in addressing the Chicago Association of Commerce, American business has been so engrossed in selling its merchandise that it has neglected the companion job of selling itself.

How is business to accomplish this new and important task of merchandising? Some pertinent observations on that subject were made by Paul B. West, president of Association of National Advertisers, Inc., in a talk before the Poor Richard Club in Philadelphia. Here are some of the things he said:

"Just as business has learned how to translate its products into terms which the public will understand and accept, so it must now learn how to translate itself in the same fashion. That job cannot be done by a bare recital of facts.

"If you are selling a hat you don't

TRIPLE-THREAT POSTER

This 24-sheet poster for "Nucoa" incorporates child appeal, appeal of economy and product identification. And it does it effectively.

advertise merely: 'I sell hats.' You advertise, not the hat, but the effect of the hat—it will protect the wearer from cold and heat, it has style, it will make the wearer look better. Just so, when you are selling your business to the public, you should not merely say, 'I hire 2,000 men who work eight hours a day and turn out 10,000 hats.' That just doesn't mean anything.

"The story is there. Your factory is filled with human beings even as you and I. They don't make hats, they make a living. You don't pay them wages, you pay them the means of going to the movies, of buying clothes and a car—products made by other workers in other factories. If through governmental edict or some catastrophe, your plant were destroyed, it wouldn't be just one less factory, it would be the cessation of happiness to the families of the workmen whom you employ. It would mean that they could not buy the things other workmen are paid to make.

"It is a job which calls for intensive study by the heads of business. It is a long time job. . . . The opinions people hold today are the fruits of seeds planted years ago. It is a job which each individual business must do in its own way. It cannot be delegated. It cannot be done by a hundred or a thousand businesses throwing into a common pot a few thousand dollars each and leaving it to some association to conduct an educational campaign to the public. You don't sell your product that way, do you? . . .

"The initiative must come from the top executives. They must be prepared to bare the soul of their business and, if there are any dark recesses that won't stand the light of publicity, they must be cleaned up. Just as a bad product will not last long in the spotlight of publicity, so will a bad business shrivel and die, as it should.

"Therein lies the very virtue of advertising. It is a far more potent protective force than any regulatory bodies or government bureaus if the consuming public only knew it. And it must be given the opportunity to know it."

Selling Salesmen

THE MERCHANDISING VALUE of a radio program is by no means limited to an air-wave appeal to consumers. At least not if the advertiser makes most of his opportunities. Take the "Log Cabin" syrup broadcast of General Foods Corp., for example. General Foods has been merchandising this program not only to consumers and to the grocery trade but to its own sales organization. This was done in several ways. First, a Visomatic film telling the entire story of the program and dramatizing the advertising and selling plans behind it was shown to each district sales manager, and these managers in turn presented it to their organizations.

Another step was the presentation of "previews" of the first broadcast to salesmen in the field so as to sell them on the new program in advance. This was done through a recording made during the audition of the first broadcast. A third move was the distribution to the sales organization of leaflets giving the complete story of the campaign.

Five other things were done, too. One was sending letters to district managers telling them of the drive's particulars. Another, distribution to salesmen of proofs of all trade-paper advertisements announcing the show. A third involved forwarding fan letters to salesmen in the territories from which the letters originated (these aid in making follow-up sales to retailers). Then the company sent announcements of the program to all of its employees, and it told 64,000 stockholders about the "Log Cabin Dude Ranch" when it was first heard over the air.

Educates Public Officials

PUBLIC OFFICIALS sometimes take action detrimental to an industry which they would not take if more fully informed about that industry. So Dairy Industry Committee, Washington, D. C., is telling the story of the milk, milk products and ice cream industry to those officials. It is doing this through a booklet, "Vital Facts about a Vital Food," which explains the simple facts about the industry and tells of its contributions to the economic, social and physical welfare of the nation.

Individual companies in the dairy field are urged to send copies of this educational literature to public officials in the cities, counties and states in which they operate. Copies may be purchased at 6 cents each in quantities up to 50 and at 3.5 cents when more than 50 are ordered.

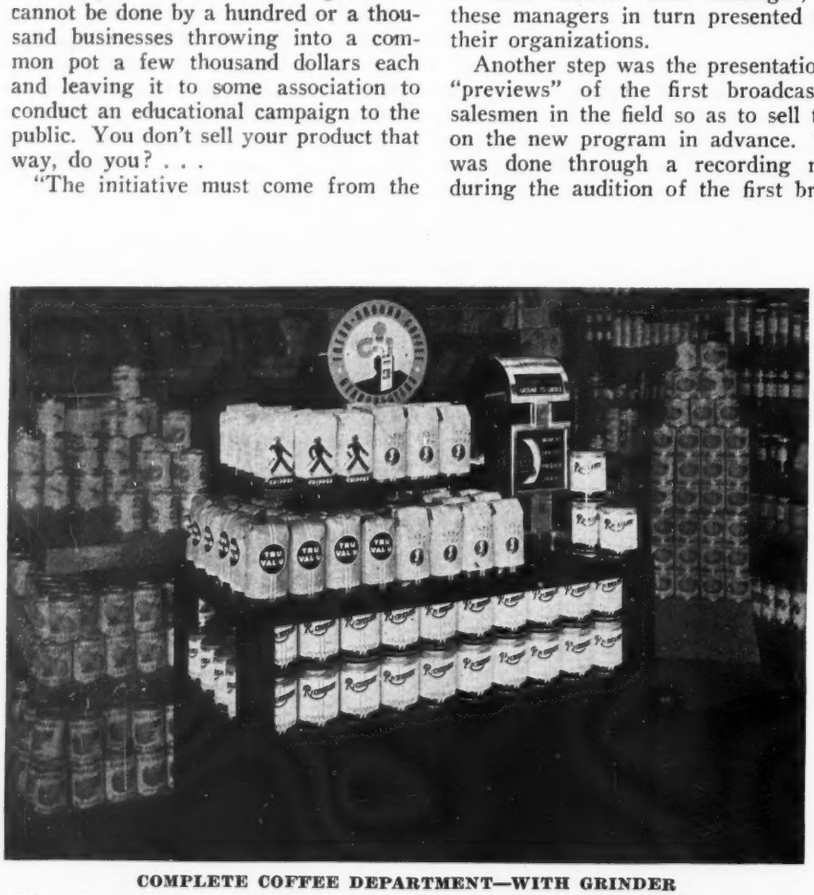
Free Promotion for Canners

SALES OF CANNED FOODS will be assisted by two current promotional activities of American Can Co., New York. The company is distributing a set of eight impressive charts litographed in four colors. These dramatize canned foods as the source of eight food essentials—protein, phosphorus, calcium, iron and vitamins A, B, C and D.

American Can also is sponsoring a national menu recipe contest and is distributing literature on it to 7,500,000 housewives through stores and women's clubs. Folders announcing cash prizes for grocers will go to all class A wholesalers, food brokers and chains.

To Promote Cherries

CHERRY PACKERS from the Great Lakes States and from New York and Canada have entered into an advertising agreement to boost sales this year. And committees have been appointed to investigate promotional systems which have proven advantageous to other food producers. The campaign will start with National Cherry Week, Feb. 15-22.



COMPLETE COFFEE DEPARTMENT—WITH GRINDER

When Sprague, Warner & Co., Chicago, made an analysis of coffee merchandising it discovered something. It found that the stores selling the most coffee were those grinding the coffee on the spot to suit consumer requirements. So the company is packaging three brands in the whole-bean and is concentrating this complete line in one place in the store by using a display stand which holds 250 lb. of coffee and which has a grinder attached.

$40,337 Saved

(*Continued from page 19*)

of routes which could be eliminated.

The trick in merging routes, of course, is in knowing which routes to eliminate and how to pick out the customers and other conditions so as to take fullest advantage of the available time on any particular route which is to be given additional new customers. In using this available time to its fullest possibilities, it is well to remember that the route driver is the most important factor in making any reorganization effective. Balancing the management's interests as well as the drivers' require considerable skill, the results of which will be well rewarded.

By eliminating routes as unnecessary, the dealer would be reducing his costs by use of the second part of the principle previously stated, namely, by keeping the same volume with a reduction in costs. The other alternative, using the example already given, would be to reorganize the routes as though six were to be eliminated and then place these six routes in territories where sales are low. In this manner total costs would be practically the same, but volume would eventually increase by having a real sales campaign with drivers having only light loads taking part. It follows that unit costs would be reduced. Furthermore, since a dealer and his sales department think in terms of volume, an intelligent sales campaign by use of the extra routes would probably bring satisfactory results in this respect.

Probably as important as immediate profits is the fortunate position in which a reorganization places a dealer. There is a constantly growing demand by the consumer for lower milk prices. Eventually, these demands will have to be met and the dealer who has his house in order will be better able to handle such a situation. While tradition may be all right in its place, it does not always pay dividends in the milk business. Accordingly, management must not be afraid to make changes in routes where careful study shows them advisable.

Maintenance

(*Continued from page 29*)

operation. Anything of a serious nature requiring a shut-down is of course taken care of at once. But for the most part emergency repairs are avoided by continual vigilance.

Milling is different from beet sugar refining, in that it is not quite as seasonal and is carried on throughout the year. I speak of sugar refining because of my experience with Great Western in Colorado, where every effort was made to avoid a shut-down during the beet grinding season. At the plant where I worked we ran for 129 days one year with only twelve hours lost time. In sugar refining it is very important that no time be lost because fermentation and bacterial action reduces the yield when dilute sugar solutions are left in process for any length of time.

In the hard wheat milling area, it is not uncommon for the mills to operate twelve hours from noon to midnight and to do a certain amount of overhauling, repair, and maintenance during the morning. Bolting cloth wears out and must be replaced, bolters need to be looked over to determine that all of the cloths are in good condition, and frequently during the milling of a crop of wheat the sieves themselves have to be changed in relation to each other. All of this can be done so that production can go ahead during the normal business hours.

Rolls must be changed occasionally. This ordinarily means a shut-down; but in one mill I know about, they just open the spouts above and run the stock onto the floor while the men throw off the roll belts and go to work changing the rolls. The stock may even be sacked and sent to feeders to distribute on other machines.

Contamination in Syrup Handling

(*Continued from page 24*)

Recently, thin tubings of high strength and high resistant metals like stainless steel have become available. This satisfactorily serves for all syrup piping. The tube walls are too thin for use with screw fittings, but welded, sweated or compression fittings are used.

Heat-resistant glass tubing and glass lined pipe are excellent for syrup lines, but, being fragile, they need careful handling. Glass tubing has the advantage of the ease with which the contents can be examined.

Fittings. The best fittings to use with the metal pipe lines are the sweated sleeve type. These give a sturdy, sanitary connection, without the dirt catching crevice around the pipe end that occurs when the ordinary threaded fitting is used. A special threaded fitting is available, leaving a shoulder against which the pipe end butts, giving a smooth inner bore without any crevices. In practice, however, this letter type has proved to be too costly and is not entirely satisfactory.

Two other joints which depend on butting the ends of the tubing together, directly or with a light gasket, are the flange and the compression fitting. These give a practically unbroken bore when properly made. They are satisfactory and possess the additional advantage of being easily removable for inspection and cleaning.

Valves. Of the valve designs that have the cleanest internal design, the plug cock and some of the newer diaphragm valves are interesting. Modern designs of sanitary plug cocks made of the corrosion resistant metals have overcome the faults of the older standard designs. They are among the most sanitary, easiest cleaned and handled valves to be obtained.

The new diaphragm valves have a shut-off action depending upon a highly resistant rubber diaphragm being closed down on a slightly raised metal dam. The body of the valve is made of resistant metal. These valves are excellent for their sanitation, ease of adjustment and repair, and moderate first cost.

Syrup Line Layouts. The actual layout of pipe lines and hook-up of equipment is fully as important as the selection of suitable materials of construction. The layout must join the units into a serviceable system for handling the syrup in a sanitary manner and with a minimum of manipulation.

The keynote should always be simplicity and clean design. Use a minimum of material but put it to the maximum use. Every line should be accessible for cleaning. There should be no "blind ends," or "dead spots" between valves, or cross-connections between lines to cause contamination.

The ideal situation is that in which no vessel or unit is solidly connected into a line. Each syrup tank should be fitted with a valve at its outlet, on the end of which is placed a compression fitting (covered with a metal cap when not in use). Connection to the line can be made by inserting a piece of pipe and closing the compression fittings.

Under no circumstances should a syrup line have a diameter smaller than $\frac{3}{4}$ in. In most cases, at least 1-in. diameter is better. Smaller sizes prevent proper cleaning.

New PACKAGES

Package Like Peanut

PACKED AS NATURE PACKED THEM, only better, are the "Wonder Pack" salted peanuts introduced by Molded Products Co., Buffalo, N. Y. The container is of a patented plastic material molded to the shape of a peanut shell and closed with a metal screw-cap on which the label is printed. It protects the nuts against deterioration because it is air-tight, moisture-proof and light-proof. Nor is it expensive, because a package containing 1½ oz. retails at 5 cents.

In spite of its unconventional form, this package is filled by machine at a rate of 60 a minute. The caps, however, are screwed on the container by hand.

Packaged to Sell

FOR A PRODUCT which must sell in the face of strong competition, a package of novel design is a valuable asset. Such a container has been adopted by Quaker Oats Co., Chicago, for its "Muffets." And in addition to a distinctive appearance, the package has the attribute of displaying its contents for appetite appeal, being equipped with a wide-vision window of transparent cellulose.

Coffee for Profit

WORKING UPON THE AXIOM that "coffee is the key to good merchandising," Sprague, Warner & Co., Chicago, has built a new "coffee-profit" program. This followed an analysis showing that the company was distributing 88 different blends of coffee under 106 different labels, and that 85 per cent of the sales were in only three brands, each in a different price range. This survey further showed that 85 per cent of the business of the retailer was in three price and blend ranges.

So Sprague, Warner did two things. It offered blends and prices meeting consumer preferences, and it enabled the merchant to concentrate on one complete line with adequate profit.

In doing this, the company concentrated on one brand within each classification of blend and price. The premium blend selected is Richelieu "Our Best Grade," and this was repackaged in vacuum tins, with a more attractive label. "Baby Stuart" brand was chosen for the moderate-price product, and "Tru-Val-U" as the economically priced brand. Both of these are packaged in triple-sealed, transparent-cellulose-wrapped cartons of distinctive design. Each of the three new containers bears a family resemblance that permits the dealer to feature "a blend for every taste—a price for every purse."

AND PRODUCTS

In addition to using newspaper advertising, direct-mail and window and store displays to promote the three blends, the company redesigned the packing cases so that they serve as display stands.

Quintuplet Candy

IT IS NOT every year that quintuplets are born nor every day that a confection as tasty or as well packaged as "Dionne Pops" goes on the market. Twenty-four of the "suckers," each wrapped in waxed paper, are put up in a box. There are six flavors—lime, lemon, orange, orange-pineapple, butterscotch and chocolate—each in a separate compartment of the package. Pictures of the Quins adorn the partitions of the box and also appear on the cover along with illustrations of the candy. Printed in blue, yellow, pink and black, and wrapped in sealed transparent cellulose, the carton is attractive.

Three ingredients important to the health of children are used in the candy —dextrose, vitamin A and vitamin D. The product, which sells at 25 cents, is manufactured by Vitamin Candy Co., Providence, R. I.

Tea in Metal Dunker

FOR CONSUMER CONVENIENCE tea has long been packed in one-cup quantities in cloth bags, these being put directly into a cup of water. But Jos. Tetley & Co., New York, has changed the "dunking" container to one made of perforated aluminum foil which is stiff enough to retain its shape. Cubical in shape, the package is formed by folding a rectangular piece of the foil. A narrow strip of the metal carries the label tag and provides a "handle" for dipping.

Distinctive Jar

IT IS NOT EVERY CONTAINER that will retain a family resemblance while permitting a wide variety in labeling. But that is true of the "ribbed" glass jar in which First National Stores, Somerville, Mass., is now distributing "FI-NA-ST" prepared mustard and "Timber Lake" sweet relish. A wide-mouthed container, it is simple, yet attractive and distinctive.

Built-In Beer Label

OLD LABELS need not be removed or new ones applied to beer bottles used by Louis Eckert Brewing Co., Los Angeles. The label lettering and design are fused into the glass as permanent fixtures. Lettering is done in yellow on a black background. This type of container is employed, however, only for Eckert's "Special" beer, which is distributed direct to the consumer. Aside from having strong sales appeal and doing away with labeling, the fused-in label prevents other brewers from using the bottle.

Wine in Glasses

WINE PACKAGED IN THE GLASS you drink it from is an innovation of American Vineyards Corp., Cleveland. Containing 4 oz., the glass is closed with a metal cap held on by a band equipped with a tear-open tab. For distribution to the home, six glasses containing "six delicious wines" are packed in a partitioned corrugated box. In addition to being novel, convenient and having reuse value, the wine glass is tamperproof. It was introduced in time to capitalize on the Holiday demand for good-cheer beverages.

BUSINESS TRENDS

Prospects for 1937

BASIC TO THE FOOD INDUSTRIES, in 1937 as always, is the question of the supply of raw materials that will be available and the prices that will be asked. With this in mind, it is well to note at this time such official and semi-official forecasts as are available.

Generally speaking, United States farms may be expected to produce a somewhat larger supply of farm produce than was obtained in 1936. This statement is subject, of course, to such modifications as may be imposed by the rainfall and other weather conditions experienced during the growing season.

Demand for farm products, both by processors and directly by the consuming public, should be greater in 193/ than in 1936. Most forecasts of industrial production and of national income foresee a rise of 10 per cent for the year. Consumer purchasing power should be correspondingly greater.

General price levels of unprocessed foods are expected to be somewhat higher than 1936-levels during the first half of 1937. The last six months of the year may see prices fall somewhat as supplies increase, unless consumer demand increases sufficiently to keep the price level up.

Meat Outlook

TOTAL MEAT SUPPLIES in 1937, according to the Bureau of Agricultural Economic, U. S. Department of Agriculture, will be smaller than in 1936, and probably will be almost as small as in 1935, when supplies were the lowest in fifteen years. The reduction is expected to be greatest in pork and the better grades of beef. It will be the result of the feed shortage induced by the 1936 drought, which seriously affected much of the live stock producing area.

Total supplies of feed grains are nearly as small as in 1934. In contrast, hay and roughage supplies are greater than in that year.

This feed situation will affect hog numbers more than it will the numbers of other kinds of live stock. The number of pigs produced in 1937 will be sharply curtailed, although the number of hogs on farms at the beginning of the year will be about the same as on January 1, 1936. Cattle numbers are expected to be 3 or 4 per cent lower.

In contrast, the number of stock sheep on farms, January 1, 1937, is expected to be greater than the number a year earlier. And the number of lambs on feed for market also may be larger.

As to the live stock price situation, it is reasonable to expect prices in 1937 to exceed those of 1936. The trend in meat consumption has been upward recently and, with higher consumer buying power in prospect for the year, this trend should continue. Combine this with the supply outlook, and higher prices will follow.

Construction News

	Pending (thousands)	Awarded December (thousands)	Total Awarded 1936 (thousands)
Bakery	$230	$87	$2,274
Beverages	1,477	747	8,681
Canning and Preserving	100	....	358
Confectionery	....	....	67
Grain Mill Products	1,220	....	4,278
Ice Manufactured	100	120	691
Meats and Meat Products	55	....	2,819
Milk Products	407	324	1,862
Miscellaneous	1,529	289	6,374
	$5,118	$1,567	$27,404

Dairy Products Trend

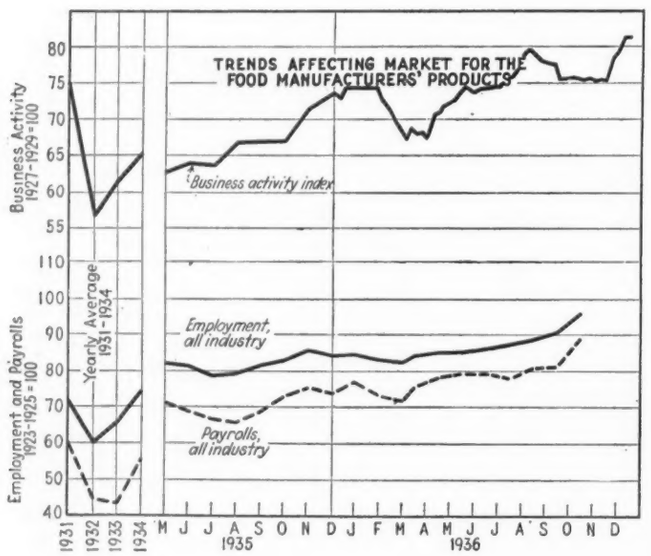
CONSUMPTION OF FLUID MILK, cream and ice cream has been on an upward trend since the low point of the depression. With increased consumer purchasing power in 1937, this trend should continue.

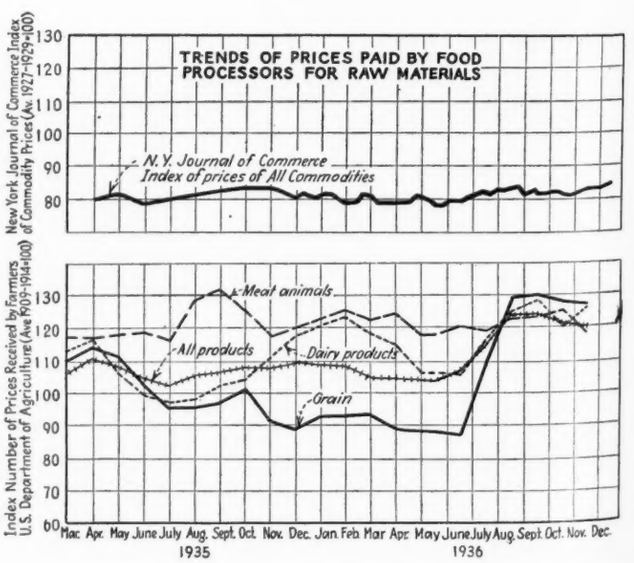
For the current winter, dairymen are faced with the general shortage of feeds that has been previously mentioned. The Bureau of Agricultural Economics forecasts that prices of milk and butterfat will be low in relation to feed prices, and to prices of other classes of livestock products. However, if 1937 harvests are more nearly average, the prices of feeds will probably decline in relation to the prices of dairy products, while prices of hogs and beef cattle will probably continue relatively high in relation to butterfat for several years. Thus the incentive to increase dairy production will not be as great as in some past periods.

Imports of butter and cheese are increasing. It is probable that imports of these products will continue to exceed those of recent years until the new pasture season.

The number of milk cows, per capita, on January 1, 1937, was probably somewhat below average, and some further decline may occur.

The price outlook for the next few years is for some rise in butter prices, relative to prices of other commodities. This will be likely to strengthen fluid




TRENDS OF PRICES PAID BY FOOD PROCESSORS FOR RAW MATERIALS
New York Journal of Commerce Index of Commodity Prices (Av. 1927-1929=100)
N.Y. Journal of Commerce Index of prices of All Commodities
Index Number of Prices Received by Farmers U.S. Department of Agriculture (Aug. 1909-1914=100)
Meat animals
All products
Dairy products
Grain
1935
1936

Business Spurts Ahead

As 1936 ENDS, the curve of business activity reaches its highest point since early 1931. Its general trend has been upward since March 1933.

Evidence of this upward climb is seen in the *Business Week* index of general business conditions which stands at 83.4 per cent of "normal" for the week ending December 19. At this level the index is 8.31 per cent higher for the month; 10.9 per cent for the year; 74.84 per cent since March 18, 1933.

Activity for the past month has been due largely to commodity buying in anticipation of higher prices, production activities to complete old-price contracts, spending of dividend and wage bonus monies to fill delayed consumer needs, and European buying of foods and war goods. Steel making activities, bituminous coal production, electric power consumption, machine tool orders, and commodity prices continue on their upward climb.

U. S. Department of Labor reports an advance of 1.58 per cent in wholesale prices for all commodities for the month ending December 19; an advance of 4.10 for the year. Farm products prices are up 2.93 per cent for the month; 13.45 per cent for the year. Food prices changed but little, up 0.71 per cent for the month; down to 0.23 per cent for the year. Weighed price indexes of New York *Journal of Commerce* follow the same trend. Its general index is up 3.65 per cent for the five weeks ending December 26 and 6.03 per cent for the year. That for grain shot up 10.37 per cent for the month; 42.33 per cent for the year while for foods the advance was only 2.04 per cent for the month with a decline of 4.77 per cent for the year.

milk prices in city and metropolitan markets.

Poultry and Eggs

FEED SHORTAGE during the winter will cause relatively large marketings of poultry, according to the Bureau of Agricultural Economics. There will be little addition to laying stocks. Because of the large marketings, stocks of frozen poultry will be large.

Hatchings in 1937 are expected to fall below the large hatchings of 1936, again because of feed prices.

Poultry prices in 1937 are expected to average below the 1936 level until fall, when the trend may reverse.

Egg production is expected to be less this winter than it was a year ago. However, more eggs are expected to be produced in the last six months of the year, so that total egg production for 1937 is forecast as slightly greater than for 1936.

Egg prices are expected to follow the usual seasonal course, and the average for the year should not be greatly different from the 1936 average.

Prices received by farmers are from the U. S. Department of Agriculture. Employment, payrolls, wholesale prices and retail prices from the U. S. Department of Labor. The business activity index is that of *The Business Week*. The cost of living index is from the National Industrial Conference Board. Index number for wholesale grocery prices is from the National-American Wholesale Grocers' Association.

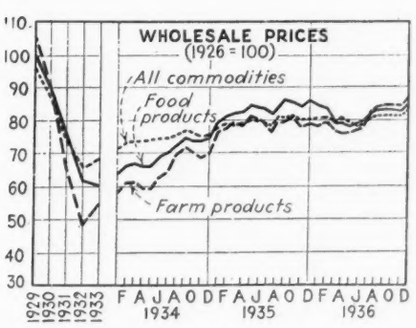
Greater Fruit Supplies

OUTPUT OF ALL FRUITS has been increasing for several years, and the Bureau of Agricultural Economics looks for this trend to continue for four or five years more. Slight declines in peach and apple production are more than offset by increased outputs of other fruits, particularly grapes, grapefruit and other citrus fruits.

Prices are likely to be governed by the facts just mentioned, in spite of increased consumer buying power. This means that apples and peaches should command higher prices, while prices of citrus fruits will decline. Table grape consumption is declining but this trend is expected to reverse, while wine grape use is on the upgrade. No trend toward higher wine prices is yet evident. Pear prices are improving.

Sugar in 1937

CONSUMPTION OF SUGAR IN 1937 should be materially larger than in 1936, according to a recent market survey made by Lamborn & Co. Here again the increase is based on prospective greater consumer purchasing power. Sugar marketing always has responded favorably to increased prosperity. An additional factor tending to increase sugar purchases is the prospect of a large fruit crop in 1937, with more sugar consumption by canners of fruits.



INDICATORS

FLOUR OUTPUT in the United States, June 30 to November 30, 1936, was 28,764,262 bbl., according to General Mills, Inc. This compares with 27,988,315 bbl. for the same five months of 1935.

ORANGE PRODUCTION in Spain, which totalled 27,000,000 boxes last year, is expected to be much smaller this year.

WHEAT PRODUCTION in 1936, for all countries except Russia and China, is estimated at 3,324,706,000 bu., compared to a 1935 production, in the same countries, of 3,407,722,000 bu.

COCOA BEAN PRICES in December exceeded the predicted price of 10 cents by a wide margin, reaching well over 11 cents for a time.

WALNUT HARVEST in California in 1936 was 41,500 tons, compared to 52,000 in 1935, and 43,000 tons in 1934.

DRIED BEAN OUTPUT for the United States in 1936 is estimated as not over 10,000,000 bags, compared to an average yield of 13,000,000 bags.

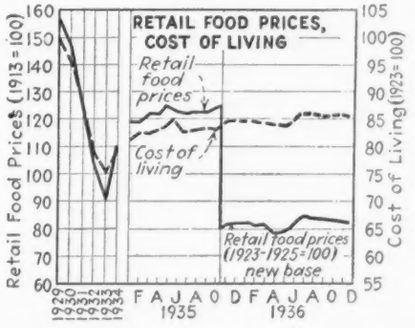
MEAT IN COLD STORAGE on December 1, 1936, was 711,733,000 lb., a rise of almost 200,000,000 lb. in one month, and 140,000,000 lb. above the 1931–35 average for the date.

BUTTER IN STORAGE on December 1, 1936, was 88,903,000 lb., compared to a five-year average figure for the date of 74,119,000 lb.

CHEESE IN STORAGE (American Cheddar) totalled 98,812,000 lb. on December 1, 1936. This figure was 18,174,000 lb. over the five-year average for the date.

POULTRY IN STORAGE, December 1, 1936, was 149,952,000 lb. This figure is 58,104,000 lb. over the five-year average.

EGGS IN STORAGE (shell and frozen), at 3,648 cases, on December 1, 1936, were down 993 cases below the five-year average.



Keeping Up WITH THE FIELD

AGMA Convention—Court Decisions—Legislation—Government Regulations—Packaging—Berry Conference

Price Law Upheld. After fighting for two decades for the right to protect prices on their merchandise, manufacturers of trademarked products were suddenly granted that privilege under state law on Dec. 7. This came as the result of the Supreme Court decision upholding the "fair trade" laws of Illinois and California. These laws prohibit the sale of standard trademarked and labeled products at prices below those fixed by producers. The court based its decision largely on the principle that the trademark or brand of the manufacturer's product was, through the operation of the principle of good will, in itself a property right of the producer and did not pass to the retailer on purchase of the merchandise.

So manufacturers of trademarked merchandise now have the right under state law to sign price contracts with dealers. Moreover, they can require that those prices be maintained, even by dealers who have failed to sign such contracts.

Laws permitting this control of prices already exist in twelve states—California, Oregon, Washington, Iowa, Illinois, Pennsylvania, Maryland, Virginia, Ohio, Louisiana, Rhode Island and Georgia. In three other states—New York, New Jersey and Wisconsin—the courts have invalidated that section of the law which makes the prices binding on non-signers.

A a result of the Supreme Court's decision, it is expected that many more states will take action on "fair-trade" laws when their legislatures meet during the next few months. And introduction of a federal measure is likely.

Meat-Grading Regulations. In keeping with the increasing attention given to food quality, the Bureau of Agricultural Economics has issued new rules and regulations covering consumer grading and stamping of meats and meat products. Effective Jan. 1, the rules supersede those established in 1926 when meat grading was begun by the bureau.

The service has expanded greatly since 1926, and now includes the grading and stamping of beef, pork, lamb, mutton and sausage products. Within the last year, more than 420,000,000 lb. of these foods was graded and stamped in 22 central markets throughout the country. One of the latest important uses of the service has been in the certification of the quality of sausage products.

This service is purely voluntary, and is paid for by the packers, distributors and large purchasers of meat products who use it. There will be no fundamental changes under the new regulations.

HONORED FOR WORK
Dr. George R. Minot received from AGMA an award for his contributions to knowledge about nutrition. Of Harvard University, he is a former Nobel prize winner.

Genealogy

In order to make it a matter of annual record, this statement is published every January.

FOOD INDUSTRIES was founded in 1928 by McGraw-Hill Publishing Co. Dr. H. C. Parmelee was its first editor. Dr. L. V. Burton succeeded him and is its present editor. Associated with him are: E. S. Stateler, associate editor; G. L. Montgomery, managing editor; F. K. Lawler and R. S. McBride, the latter in Washington, assistant editors.

AGMA Takes Up Problems. Responsibilities to employees, consumers and distributors were keynotes of the annual convention of Associated Grocery Manufacturers of America, in New York, Nov. 30–Dec. 2. The first of these subjects was covered most effectively in talks by R. R. Deupree, president, Procter & Gamble Co., and by T. G. Spates, director of industrial relations, General Foods Corp.

Mr. Deupree drove home the point that to maintain the best relations with employees, the manufacturer must do three basic things—assure the employee a steady job, help him to become a capitalist by assisting him to save money and to keep it, and make it possible for him to look forward to security in his old age. Procter & Gamble has done this through a profit-sharing plan, a 48-week guaranteed employment plan, good pay, vacations with pay, old-age pensions and other measures.

Speaking about the relations of manufacturers to consumers and to the public at large, Donald D. Davis, president, General Mills, Inc., made these points: It is the responsibility of the manufacturer to increase national prosperity, and it is his responsibility to give the consumer her true money's worth when she buys his products.

Much attention was paid to distribution problems and to relations with distributors. Definite recommendations were made for uniform state legislation to effectively regulate loss-leader selling. The proposed measure provides for a tentative minimum mark-up of six per cent on retail sales and prohibits wholesale selling below cost or replacement cost, which ever is lower. And the Association also recommended enactment of federal legislation to prevent below-cost selling.

The attitude of the manufacturers toward revision of the Food and Drugs Act was expressed in a resolution endorsing an adequate, constructive and just enactment of a revised law by the next Congress.

As for the Robinson-Patman Act, AGMA went on record as approving the basic purpose of the act, but it cited these defects: (1) It is too vague, (2) it, in effect, lays down affirmative rules of business conduct which are uneconomic and unsound, including rules with respect to a quantity price, distribution service to dealers and payment for such service by them, (3) it is grossly unfair in denying a "meet competition" defense to any enforcement proceeding other than that instituted by the Federal Trade Commission. The Association believes Congress should promptly correct these defects.

AGMA also condemned as basically uneconomic legislation such as that proposed in the last Congress to prohibit food and other grocery manufacturers from selling upon a delivered-price basis.

20 Packaging Awards. Packaging history was made in last year's competition for the Irwin D. Wolf Awards. So this year's competition is to be kept on the same basis. Which is to say that 20 awards will be made for distinctive merit in packaging, in addition to the Irwin D. Wolf Trophy. The awards will be made in each of the following classifications:

The most effective package employing (1) a single color; (2) more than one color. The most effective use (3) of typography or lettering, (4) of the elements of design to create shelf visibility. The most effective (5) redesigned package, (6) use of merchandising ingenuity, (7) incorporation of consumer convenience. (8) The most effective packaging of a combination sales unit. (9) The most effective package employing a secondary use. (10) The most effective use of layout or decorative design. (11) The most effective package insert. The most effective use (12) of inventive genius in package construction, (13) of two or more packaging materials in one package. The most effective (14) family of packages, (15) package designed to promote the product as a gift, (16) package for a product not previously packaged. The most effective shipping container (17) from the standpoint of good design, (18) from standpoint of merchandising and construction ingenuity. The most effective (19) counter display pieces, (20) floor display pieces.

Packages introduced during 1936 are eligible. Entries should be sent to Irwin D. Wolf Awards, 232 Madison Ave., New York. All entries will be displayed at the Packaging Exposition in New York, March 23–26.

Berry Has His Meeting. Major Berry's much talked about industrial conference early in December pulled an attendance of 1,500. But representatives of the bigger companies were conspicuously absent, except for those attending in the role of observers. The meeting was held in an atmosphere of hostility that resulted in several flare-ups on the floor and a general refusal of large sections of industry to participate any further.

Seven committees, however, were appointed to consider various aspects of the industrial situation and to make recommendations for their improvement. While labor and management were equally represented on these committees, the representatives from management necessarily were principally from fields in which the tendency is toward small units. These committees proposed several things, ranging from minimum-wage standards to "fair-trade" regulations. And a "correlating" committee was named to work these ideas into a consolidated program. The committee has a tangle of proposals from which it may draw almost anything, and it is considered that the meeting did little to clarify thinking on the subject of needed improvements for industry.

In general, speeches at the conference did not hold the interest of those present. This is reflected in the following remark by a taxi driver: "What kind of a meeting is that? They been driftin' out o' there all afternoon."

Approve Patman Act. Three-quarters of the food manufacturers, wholesale distributors and retailers approve the intent of the Robinson-Patman Act. Only 40 per cent have received any benefit so far from the act, though another fifteen per cent expect they will benefit from the law in the long run. These figures were cited by Paul S. Willis at the annual convention of AGMA, from a survey made for the Association.

Over 80 per cent of the manufacturers, distributors and retailers favor legislation which would prohibit the sale of grocery products at less than invoice or replacement cost, whichever is lower. Among those who favor laws against selling below cost, 36 per cent of the manufacturers, 23 per cent of the wholesalers and 13 per cent of the retailers are opposed to having mark-ups stipulated by law.

The Blue Section Moves

"Mixing, Part II," will appear in FOOD INDUSTRIES in February instead of January, as previously announced. Look for it next to the back cover, in the next issue.—The Editors.

CONVENTIONS

JANUARY

4-6—Northwest Canners' Association, Multnomah Hotel, Portland, Ore.

12—Southeastern Millers' Association, Brown Hotel, Louisville, Ky.

14-16—American Fruit and Vegetable Shippers' Association, Stevens Hotel, Chicago.

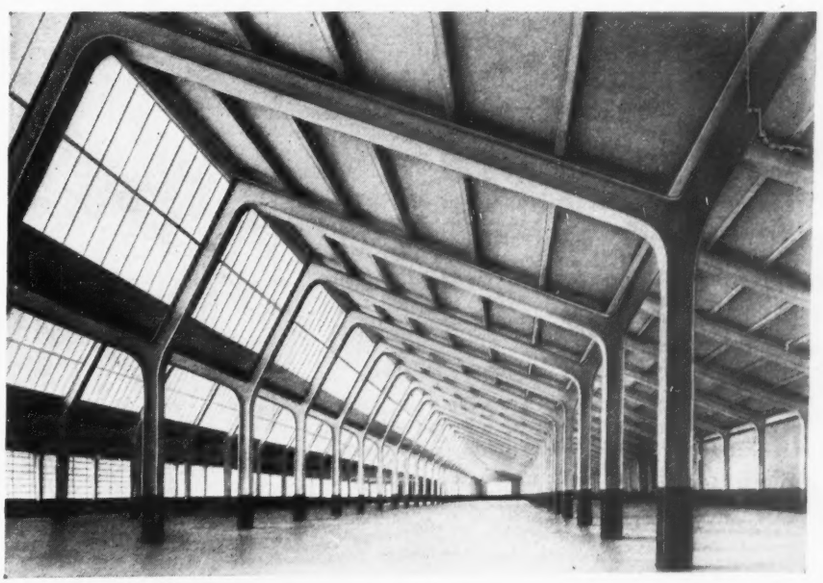
24-30—National Canners' Association, Stevens Hotel, Chicago.

25-29—Canning Machinery & Supplies Association, exposition, Stevens Hotel, Chicago.

23—National Food Brokers' Association, Stevens Hotel, Chicago.

25-26—Potomac States Bakers' Association, Lord Baltimore Hotel, Baltimore.

27—National Pickle Packers' Association, Palmer House, Chicago.



FOOD PLANT OF THE FUTURE?

Through the application of rigid-frame construction, Austin Co., Cleveland, has developed a new type of industrial building. It is said to provide a maximum of uniform daylight, broader aisles and unobstructed headroom, and to be particularly adaptable to the requirements of food plants.

The replies in this survey indicate clearly that since the passage of the Robinson-Patman Act, payment of brokerage directly to buyers has been practically eliminated. And only 16 per cent of the manufacturers are still paying brokerage through headquarters.

Nearly 50 per cent of the manufacturers and 57 per cent of the distributors replied in favor of advertising allowances as such. But almost 70 per cent of the manufacturers and 67 per cent of the distributors favored advertising and distribution allowances for services that are actually rendered.

Both manufacturers and distributors, by a 70 per cent vote, favored the requirement of Robinson-Patman Act that quantity discounts be justified.

One of the significant points brought out by many distributors was the belief that manufacturers should carry the entire burden of advertising their products.

Higher Sugar Quota. To take care of an increase in consumption. Secretary Wallace has made the initial sugar quota for 1937 higher than that for 1936 by 248,582 short tons. This brings the total quota to 6,682,670 tons, allocated among producing countries as follows:

(Short tons, raw value)	1937	1936
Cont. U. S. beet sugar production area	1,613,576	1,550,000
Louisiana and Florida	270,664	260,000
Hawaii	976,685	941,199
Puerto Rico	831,508	801,297
Philippines	1,035,742	998,110
Virgin Islands	5,462	5,264
Cuba	1,922,423	1,852,575
Foreign countries other than Cuba	26,610	25,643
Total	6,682,670	6,634,088

Syrup quotas were also established, Cuba being allotted 7,970,558 gal. and the Dominican Republic, 830,894 gal. These quotas are in terms of wine gallons of 72 per cent total sugar content.

Obsolescence in packaging methods often sneaks up on you—saps profits behind your back, so to speak. Of course you would not knowingly waste money—but there are ways of *saving* that may not have come to your attention, or your packaging department's.

For example, you may still be using hand wrapping because you feel that your volume on any one product or package-size does not warrant the investment in a machine. However, you can now obtain a very moderately priced machine that handles *many different sizes,* using practically any type of material.

And even if all your packaging operations are mechanical—it may still be possible to make substantial savings in both labor and material costs by replacing obsolete machines with modern types. Machines with Electric Eye registration, for instance, use printed material in roll form—making real savings in cost of buying material in cut-to-size sheets.

If you will write and tell us what your present packaging equipment is, we will tell you what our latest machines of each type will do in comparison.

Some of the many products wrapped on our machines

PACKAGE MACHINERY COMPANY, Springfield, Mass.
NEW YORK CHICAGO CLEVELAND LOS ANGELES
MEXICO, D. F., Apartado 2303 Peterborough, England: Baker Perkins, Ltd.
Melbourne, Australia: Baker Perkins, Pty. Ltd.

PACKAGE MACHINERY COMPANY
Over 200 Million Packages per day are wrapped on our Machines

CONCENTRATES

● Victory went to the government in the first attack upon the Reciprocal Trade Agreements Act. The Customs Court dismissed a test case brought by Florida Agricultural Tariff Association, holding that the constitutionality of an act cannot be attacked by one not injured by the statute. The Florida association had attempted to pay a higher duty on a shipment of pineapples from Cuba than that levied under the Cuban Trade Agreement of 1934.

● *It is unconstitutional to prohibit the addition of fats and oils other than milk fat to milk, the Illinois State Supreme Court has ruled. The court held that the Illinois filled-milk bill was unconstitutional.*

● Chain food stores are seeking to check the epidemic of discriminatory taxation and other legislative restrictions by doing good deeds for producers. Last August, when there was a surplus of beef on the market, the chains put on a drive which boosted their sales of the meat by 35 per cent. Then they pushed peaches to relieve an oversupply, and now the plan is to promote turkey and grapefruit, of which there are bumper crops.

● *Through its soil-conservation program, the AAA expects to take out of cultivation next season 5,000,000 acres that were planted to corn during the "base period" of 1932-33.*

● It is expected that bovine tuberculosis eventually will be completely eradicated from this country. Its prevalence in 43 states has already been reduced to less than one-half of one per cent.

● *An up-to-date resume of standards of identity for foods is contained in the fifth revision of "Service and Regulatory Announcements, Food and Drug No. 2," issued by the Department of Agriculture.*

● State College of Washington, Pullman, will hold an Institute of Dairying, March 8-13.

Correction on Pensions

● Swift & Co. does not contemplate abandoning its pension plan with the advent of federal collections for social security as was stated in this column last month, according to A. D. White, of the company's public relations department.

MEN, JOBS *and* COMPANIES

Industry

• ARMOUR & Co. has moved its Atlanta district offices to Birmingham. Armour & Co. of Delaware is offering to the public $20,000,000 of first mortgage, 20 year, 4-per cent bonds.

• BIERLEY'S INC., will establish a branch plant in Mission Valley, Tex. The plant will have a capacity of about 1,000,000 gal. of orange juice a season.

• BOWMAN & Co., a subsidiary of Standard Brands, Inc., will open a new egg-breaking plant at Ft. Smith, Ark., early this year. During a season lasting from March to June, the plant will pack 60,000 cases of eggs.

• BREWING CORP. OF AMERICA is putting up a new brewing room and a storage house at Cleveland. The cost is placed at $100,000.

• CARNATION MILK Co. has suspended the manufacture of evaporated milk at its Jefferson, Wis., plant.

• CORN PRODUCTS REFINING Co. will erect at Pekin, Ill., a $2,000,000 sugar plant.

• DELMAR CANNING Co. recently suffered an estimated loss of $1,500,000 when four sardine canning and reduction plants and two warehouses at Monterey, Calif., were destroyed by fire.

• HAMILTON & SONS CANNING Co. is building a vegetable canning plant at Corpus Christi, Texas.

• HERSHEY CREAMERY Co. will construct a $65,000 plant at Chambersburg, Pa.

• GEO. A. HORMEL & Co., Austin, Minn., has introduced a new line of canned meat products. These will be distributed through a subsidiary, Dinty Moore Products Co.

• IDAHO MEAT PRODUCERS, INC., will build a plant at Caldwell, Idaho, at a cost of $125,000.

• KRAFT-PHENIX CHEESE CORP. recently bought the building and equipment of Carlstrom Cheese Co., St. Louis.

• MORGAN PACKING Co. is making extensive additions to its canning plant at Scottsburg, Ind.

• NATIONAL DAIRY PRODUCTS Co., New York, has purchased the assets and business of the ice cream division of Whiting Milk Companies, Inc. National Dairy also has obtained managerial control of Whiting's milk division with an option of ownership.

CHARLES A. PEACOCK

He is now vice-president of E. Pritchard, Inc., Bridgeton, N. J. Percy Richardson is treasurer and general manager; William Fahr, secretary; C. W. Hopper, sales manager. Arthur E. Schiller, formerly chief chemist, is now manager of both the company's plants in Bridgeton. Norman W. Stewart continues as president.

MILTON HULT

National Dairy Council recently named him president. He succeeds M. D. Munn, who headed the organization for sixteen years. Mr. Hult was with Superior Dairy Co., Davenport, Iowa, and is a past president of International Association of Milk Dealers.

• PHILLIPS PACKING Co., Cambridge, Md., has introduced a canned beef soup, bringing the number of "Down-in-Dixie" soups to seventeen.

• PREMIER-PABST CORP., Milwaukee, is suing to enjoin Louis Ziegler Brewing Co., Beaver Dam, Wis., from using three red, white and blue stripes on its beer labels.

• RAHR MALTING Co., Manitowoc, Wis., has increased its capitalization from $1,000,000 to $4,000,000. The company recently acquired a storage elevator and malt plant at Minneapolis and erected a modern malting plant at Shakopee, Minn.

• REID, MURDOCH & Co., Chicago, is introducing a line of thirteen soups under its "Monarch" brand.

• SPRECKELS SUGAR Co. is building at Woodland, Calif., a plant claimed to be the last word in scientific methods for sugar-beet processing. The plant will have a daily capacity of 2,000 tons.

• VALLEY DISTILLERY, INC., has begun operations at a citrus winery at McAllen, Texas. The plant will process about 3,500 tons of grapefruit and oranges during its first season.

• VAN VECHTEN MILLING Co., Rochester, N. Y., has had an involuntary petition in bankruptcy filed against it. Van Vechten is the last of many flour mills that once flourished in Rochester.

• WARD BAKING Co. suffered a loss of 10,000 sacks of flour on Dec. 3 when fire swept the basement of its plant at Columbus, Ohio.

Personnel

• JOHN L. ALBRIGHT, Owen, has been elected president of Wisconsin Canners' Association.

• HAROLD ANDERSON will resign March 1 as general manager of National Biscuit Co.'s National Milling branch, which is in Toledo, Ohio.

• E. C. BADGER is the new president and treasurer of Kingsbury Breweries, Manitowoc, Wis. He succeeded Daniel C. Bleser, resigned. Felix Pauly has been named vice-president.

• DR. LAWRENCE W. BASS returned to Mellon Institute of Industrial Research, Pittsburgh, as assistant director, on Jan. 1. Dr. Bass had been with Borden Co. for six years, since 1932 as director of research. Previously he was executive assistant at Mellon Institute.

• DANIEL C. BLESER, former president of Kingsbury Breweries, has organized Bleser Brewing Co., Manitowoc, capitalized at $250,000.

• DR. WILLIAM H. CATHCART, who had a teaching fellowship at New York University, has gone with the research department of American Institute of Baking, Chicago.

• J. K. DALE, formerly with A. E. Staley Co., has joined the research division of Commercial Solvents Corp., Terre Haute, Ind.

• ROLFE FRYE, Fort Worth, heads up Cereal Chemists of Texas for the coming year. L. W. Sherman was elected vice-president.

• FLETCHER GOODRICH has succeeded L. J. Dillon as manager of the Pet Milk plant at Hudson, Mich. Mr. Dillon left on leave of absence.

• CRAIG DILLON, Vincennes Packing Corp., has been chosen president of Indiana Canners' Association.

MORE FOOD PLANTS ARE USING

NATIONWIDE OAKITE SERVICE

to help increase efficiency of

Cleaning and Sterilizing Operations

PIPE LINES CLEANED without dismantling!

You can clean pipe lines without dismantling . . . save time and expense if you follow the simple Oakite method of doing this job. The Oakite materials recommended for this work remove all residues and accumulations. And being free-rinsing, nothing remains on surfaces to impair purity or flavor. Safe to use on all types of piping.

Ask us to send you details of this method.

Wherever foods are handled and processed, a high degree of cleanliness and sanitation of BOTH equipment and plant is a major requirement. That is one reason why more food plants are using Nationwide Oakite Service, because through it, they secure the benefit of 28 years of successful experience that is helping them increase the efficiency of ALL their cleaning and sterilizing operations.

Safeguard Quality at Low Cost!

Maintaining your required sanitary standards the Oakite way safeguards quality because it is dependable, effective, thorough. And you always have the assurance your cleaning and sterilizing operations are being performed economically, efficiently. Let us tell you of the additional advantages available through the use of modern Oakite cleaning and sterilizing materials. No obligation, of course.

Manufactured only by
OAKITE PRODUCTS, INC., 26G Thames St., NEW YORK, N. Y.

Branch Offices and Representatives in all Principal Cities of the U. S.

OAKITE

TRADE MARK REG U.S. PAT OFF.

SPECIALIZED INDUSTRIAL CLEANING MATERIALS & METHODS

• H. C. HALLAM, former secretary of American Brewers' Association, has established a Congressional and Departmental service at Washington, D. C.

• W. V. HASKELL has been chosen president of Kansas Association of Ice Cream Manufacturers. He is head of Topeka Pure Milk Co.

• C. F. HAUG, Mason, Au & Magenheimer Confectionery Manufacturing Co., Brooklyn, N. Y., has been named president of Association of Confectionery and Chocolate Manufacturers of the State of New York to fill out the unexpired term of Frank Kobak, who resigned.

• GEORGE W. HENNERICH succeeds Wilson W. Brown as manager of Ice Cream Merchandising Institute.

• L. O. HOFFMAN is now general manager of the Huron, S. D., plant of Armour & Co.

• TOM HOLLINGSHEAD will take the place of Ralph M. Bohn as technical director of Independent Biscuit Manufacturers Co. Mr. Hollingshead has been with Gelatine Products Co., Detroit, having previously served as head food chemist on the staff of Griggs Cooper & Co., St. Paul.

• EDWARD V. LAHEY has been elected president of Massachusetts Brewers' Association. He is with Smith Bros., Inc., New Bedford.

• F. A. LINDSEY has been made treasurer of Brock Candy Co., Chattanooga, to succeed the late W. J. Kayler.

• GEORGE C. MCKAY recently retired as vice-president, treasurer and assistant secretary of Kellogg Co., Battle Creek, Mich. He continues as a director of the company, which he has served 30 years.

• WILLIAM J. MONAGHAN, who is with the Pioneer Ice Cream division of Borden Co., New York, will be president of Association of Ice Cream Manufacturers of New York State for the coming year.

• H. L. PERRIGO, Victor Flour Mills, Pittsford, has been re-elected president of New York State Millers' Association.

• WALTER REED, Lake Odessa, is the new president of Michigan Canners' Association.

• PAT RODDY is now president of Tennessee Bottlers' Association. He is from Knoxville.

• FRANK N. RUSSELL, Russell Creamery Co., Brainerd, Minn., has been elected president of Northwest Association of Ice Cream Manufacturers.

• D. R. SMITH, Miami, Fla., heads up Southern Ice Cream Manufacturers Association.

• ALFRED H. STOLDT, Monroe, has again been chosen president of Wisconsin Swiss & Limburger Cheese Producers' Association.

Deaths

• HARRY A. BAHR, 47, president of Bahr Cheese Co., New York, and a director of Kolb Cheese Co., Lena, Ill., at Crestwood, N. Y., recently.

• FRED W. GARLICK, 61, former vice-president of Garlick Dry Fruit Co., Chicago, Ill., Dec. 2. He has been in the food business since 1888.

• ANTHONY W. HEIT, 76, former president of Heit-Miller-Lau Co., which later became Wayne Candies, Inc., Nov. 30, at Fort Wayne, Ind.

• ERNEST KLINKERT, 92, operator of Klinkert Brewery, Racine, Wis., from 1871 until prohibition, Nov. 22.

• ROBERT K. KNORPP, 43, president of the Brooklyn, N. Y., candy company bearing his name, Dec. 2.

• GEORGE KOLOCHESKI, 58, president of Oconto Brewing Co., Green Bay, Wis., Dec. 1.

• HUGH P. MCCORMICK, 46, vice-president of McCormick & Co., Baltimore, Dec. 3.

• IRVIN H. REESE, 34, manager of American Cone & Pretzel Co's. Milwaukee branch, Nov. 23.

• LEWIS F. SAMPSON, for twenty years treasurer of Atlantic Salt Co., Boston, Dec. 8.

Associated Industries

• CHAIN BELT CO., Milwaukee, has elected John T. Brown, former works manager, vice-president.

• CONTINENTAL CAN CO. has appointed E. S. Linville and James F. Cole assistant general managers of sales. Mr. Linville's headquarters are at New York; Mr. Cole's, at Baltimore. The company has also appointed E. J. O'Connor and L. J. La Cava assistant general managers of sales in the general line division, with headquarters at New York. Continental Can will build a new can manufacturing plant at Tampa, Fla., at a cost of about $500,000.

• DEWEY & ALMY CHEMICAL CO. has appointed Gough Brokerage Co., New Orleans, representatives for labeling adhesives.

• FRICK CO., INC., has appointed John T. Murphy branch manager of its New York office.

• GARDNER DAIRY EQUIPMENT CORP., has purchased an office building and 142,000 sq.ft. of manufacturing space at La Porte, Ind.

• INTERNATIONAL NICKEL CO., INC., New York, has added Gerald R. Brophy to its development and research staff.

• SHERWIN-WILLIAMS CO., Cleveland, has formed an industrial and transportation color service. It offers designers assistance not only in developing desired colors but also information on types of finishes and their suitability.

57

THE INDUSTRIAL KEMP CARBURETOR

Scintillas of the World-Wide luster of the name of

HEINZ

shine upon KEMP of BALTIMORE . . . *for* in the great plants that have made the over-modest "57" a symbol of good eating . . . a diligent search will disclose the equally modest KEMP INDUSTRIAL CARBURETOR doing its stuff.

Discriminating housewives of the world expect much of Heinz . . . and Heinz, in turn, expects the utmost worth in the materials, equipment and people who must uphold this tradition of the "57". Here the presence of the Industrial Carburetor is tribute enough to its ability to do its job* surpassingly well.

* In the Heinz plant the Industrial Carburetor supplies pre-mixed air and gas for the economical heating of can making machinery, peanut roasters and bean baking ovens. For what it can do for your plant, regardless of the fuel now employed, write the **C. M. Kemp Manufacturing Company, 405 East Oliver St., Baltimore, Maryland.**

KEMP of BALTIMORE

What Is a Potato Chip?

(*Continued from page 11*)

show that the claims as to the small amount of grease and starch present are far above the mark. The so-called greaseless chip yielded 28.9 per cent of grease (ether extract). And the destarched product was found to contain 4 per cent more starch than the average for the group tested. It is evident that very little of the starch is hydrolized to the reducing sugar stage during the comparatively brief immersion of the chips in the hot fat.

Although the march of time has brought about better methods of processing potato chips, the amount of adhering fatty oil or grease has not been reduced (Table II). The tendency appears to be toward a chip of somewhat higher moisture content but less total ash. To what extent common salt made up the ash in earlier days [1] (1896-1906) is a matter for conjecture. But approximately one-third of the inorganic constituents of the modern product consist of that ingredient. Inasmuch as the finished chip usually is salted to taste, the three-fold variation in salt content (Table I) does not necessarily mean a difference in nutritional value in respect to minerals, and the word "mineralized" used in advertising means something else entirely.

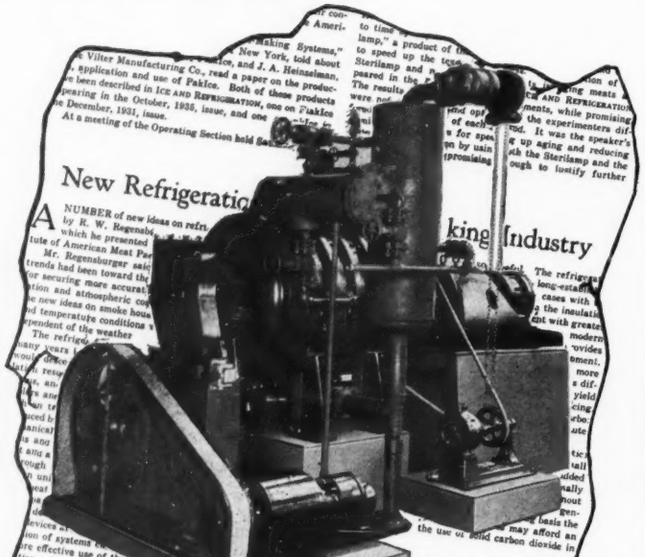
In an attempt to conserve the mineral matter of the potato, most chip manufacturers rub off the skin without removing the cortical layer. Then, after cutting out the eyes, they slice the potato directly into the hot (410 deg. F.) fat. And when frying is completed, as much of the adhering grease as possible is removed centrifugally or by draining. Salting to taste completes the operation.

This method differs somewhat from that worked out more than fourteen years ago by Vosbury.[2] Her method included soaking the sliced potatoes in cold water immediately before frying.

The potato chip has long since passed the novelty stage. The consuming public has accepted it as a ready-to-eat food. But it wants that food crisp and fresh. The manufacturer can contribute to these ends by certain precautions. He should renew the frying medium often enough to guard against rancidity, and he ought to adopt a package which will absorb the photochemically active wave-lengths of light which promote rancidity. And, with official sanction, he may use harmless anti-oxidants. The merchant distributing the potato chips should buy quantities which will permit a quick turn-over of his stock, and both merchant and manufacturer should adopt sane and common sense advertising.

The raw material from which the potato chip is made is a universal food, and it is recognized as a good source of the vitamins A, B and C. It is a product whose fuel value is as well utilized as that of most foods, and which shares honors with bread as the "staff of life." The nutritional qualities of the potato probably do not suffer much, if at all, in the process of being converted to potato chips. So manufacturers need not stretch the truth to present an appealing story in their advertisements.

It's in the News



520 TONS PAKICE BRIQUETTES EVERY DAY

Meat Packers the country over have recognized the convenience and economy of the Vilter Pakice Machine Today, seven of the country's largest packers are producing and using their own Pakice briquettes at the rate of 520 tons a day—ice in its most efficient form for product or bunker icing. May be stored in bins, like coal, and spouted or chuted.

Costs less to install, less to operate, and pays for itself in a short time.

Get complete details of this remarkable machine.

Write

THE **VILTER MANUFACTURING COMPANY**
2115 SOUTH FIRST STREET
MILWAUKEE, WISCONSIN

REFERENCES

[1] W. O. Atwater and Chas. D. Woods, The Chemical Composition of American Food Materials. U. S. Dept. of Agri. Office of Expt. Sta., Bull. 28, 1896; W. O. Atwater and A. P. Bryant, ibid., Bull. 28 revised, 1906.

[2] Margaret C. Vosbury, Methods of Manufacturing Potato Chips. U. S. Dept. of Agri. Bull. 1055, May 10, 1922.

BOOKS RECEIVED

REFRIGERATING DATA BOOK AND CATALOG. Published by the American Society of Refrigerating Engineers, 37 West 39th St., New York, N. Y. 1936. 742 pp. 9½x6½ in. cloth; illustrated. Price $4 in U. S. A. $4.50 elsewhere.

Fifteen new and seven fully revised chapters add exceptional value to the third edition of this authoritative reference handbook. New chapters of particular value to the food plant man cover the subjects of air conditioning, freezing and storage of foods, refrigeration in the meat packing and dairy industries, automatic control of refrigeration, refrigeration servicing, fans and duct systems, and evaporators, brine coolers and unit coolers.

The entire book has been made more useful for self-instruction of men working with air conditioning and refrigeration than previous editions.

MILK AND MILK PRODUCTS, SECOND EDITION. By Clarence Henry Eckles, Willis Barnes Combs, and Harold Macy, University of Minnesota. Published by McGraw-Hill Book Co., 330 West 42nd St., New York, N. Y., 1936. 385 pp., 6½x9¼ in.; cloth; illustrated. Price $3.50.

Published primarily as a textbook for first and second year students of dairy science in agricultural colleges, this book has much to offer the young operator or technician who wants to get ahead in the food manufacturing industries. The first edition came out seven years ago; too early to include significant developments in the dairy industry and advances in knowledge of milk and milk products. This edition endeavors to bridge that gap.

THE FOOD INDUSTRIES. Prepared and published by the Marketing Research and the Foodstuffs Divisions, Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce, Washington, D. C. 1936. 70 pp. 7⅞x10¼ in., paper. Price 10 cents.

Identified as Marketing Research Series Bulletin No. 103 this study presents statistics covering: (1) present status and recent trends of production, employment and consumption in the food manufacturing and processing industries, (2) channels of distribution of food products, (3) exports and imports of foods and (4) trends in wholesale and retail food prices.

It also gives sources from which data concerning the food industries can be obtained as well as lists a bibliography of 200 books and magazines on food and a registry of 300 national and interstate trade associations.

THE TOWNSEND CRUSADE. Published by Committee on Old Age Security of the Twentieth Century Fund, Inc., 330 West 42d St., New York, N. Y., 1936. 93 pp., 5½x8½ in., paper. Price, 25 cents.

Social legislation is still in the infant stage. The form it takes as it goes through its growing-pains stage is a responsibility of every American citizen. Those in charge of present day businesses have a double responsibility and they should be at least conversant with the several varieties of social legislation proposals. The Townsend Scheme as such may be as dead at it appears, yet the consciousness of the need for some kind of provision for the aged is far from dead.

In this intended impartial review of the Townsend Movement and its probable effect upon society and business are chapters of concern to every manufacturer. Whatever form social legislation takes, there will be an effect upon business policies, upon wages, and upon employment.

PRODUCTION PROBLEMS SOLVED TO ORDER

ALMOST every modern plant in the food industries is already applying the Continuous Flow Principle in some degree. All bottle, can or carton filling machines and most labeling and wrapping machines are based upon this principle.

The next step is to unify the operation of the entire plant so that there is Continuous Flow at maximum speed from the receiving of raw materials to the shipping of finished product.

Mathews engineers are trained to see production as one total process based upon Continuous Flow. A Mathews survey is problem solving to order, revealing bottlenecks if they exist, placing every processing step in its logical sequence, eliminating lost motion and unnecessary handling.

Mathews systems, backed by over 32 years' engineering, make maximum logical use of gravity, and include Roller, Wheel, Belt, Live Roller, Drag Chain, Pallet, Continuous Apron, Trolley Conveyers, Vertical and Inclined Elevating Conveyers, Spiral Roller Conveyers and Spiral Chutes.

"Problems Solved with Mathews Conveyer Systems" is a book which illustrates many typical examples of the Continuous Flow Principle. Write for it today.

The illustration at the left shows an efficient layout of conveyers in the bottling house of a Pennsylvania Distillery. An inclined, level, declined, and level belt conveyer with roller conveyer is used to convey empty cartons from warehouse to packers.

An outstanding application of the Continuous Flow Principle of Handling Materials. A four-tier bread cooler handling 35,000 loaves per day.

MATHEWS CONVEYERS

CONTINUOUS FLOW PRINCIPLE IN HANDLING MATERIALS

MATHEWS CONVEYER COMPANY
116 Tenth Street, Ellwood City, Penna.

PATENTS

Lecithin Extracted From Vegetable Phosphatides by a Fat Solvent—Alfred Schwieger, Hamburg, Germany to American Lecithin Co., Cleveland, Ohio. No. 2,057,695. Oct. 20, 1936.

Pretzels Twisted by Mechanical Means—Charles A. Elliott, Jefferson, Ia. No. 2,057,772. Oct. 20, 1936.

Vitamin C Content of Foods Increased Through Addition of an Ester of 2-Keto-laevo-gulonic Acid—Franz Elger, Basel, Switzerland to Hoffmann-La Roche, Inc., Nutley, N. J. No. 2,058,220. Oct. 20, 1936.

Cashew Nut Shell Liquid Removed by Applied Heat Without Scorching of Nut Kernels—Edward R. Hughes, Morristown, N. J. to Harvel Corp. No. 2,058,456. Oct. 27, 1936.

Starch Separated From Potatoes in a Unified Close-Connected Mechanical System—Charles K. Brandstrom, Seattle, Wash. No. 2,058,560. Oct. 27, 1936.

Dough Products Baked in Pans Made From Fibrous Material Coated on Both Sides With Metal Foil—William E. Broeg, Peoria, Ill. No. 2,058,662. Oct. 27, 1936.

Starch Recovered From Corn in a Closed Water System for Mill House Separate From a Closed Water System for Separation of Corn Gluten—Robert Edman Greenfield, to A. E. Staley Mfg. Co., Decatur, Ill. No. 2,058,683. Oct. 27, 1936.

Ultra-Violet Radiations Produced by Electric Arc Lamp Having Three Concentric Tubular Elements—George Sperti, Covington, Ky. to Sperti Lamp Corp., New York, N. Y. No. 2,058,734. Oct. 27, 1936.

Food Wrapped in Transparent Cellulose Sterilized Against Mold by Passing Through Ultra-Violet Ray Zone Equipped With Conveyor and Rotating Holders to Expose all Surfaces of Wrapped Products to Ultra-Violet Rays—Wade W. Reece, to W. E. Long Co., Chicago, Ill. No. 2,058,826. Oct. 27, 1936.

Sardines Pre-treated in Steam Atmosphere for Removal of Excess Moisture Preliminary to Canning—Harold E. Bergen, Pacific Grove, Calif. to K. Hovden Co., Monterey, Calif. No. 2,058,849. Oct. 27, 1936.

Bottle-Shaped Paper Containers Closed by Cap Sealing—Lydia B. Koch to Reinforced Paper Bottle Corp., New York, N. Y. No. 2,058,892. Oct. 27, 1936.

Egg-White Adjusted to pH 6 Acidity Followed by Addition of Ammonium Hydroxide to Give pH 8.6 Preliminary to Drying—Henry I. Rosner, Brooklyn, N. Y. to Joe Lowe Corp., New York, N. Y. No. 2,059,399. Nov. 3, 1936.

Confectioners' Jelly Made From Dry Pectin, Sodium Acetate and Lactose—Donald R. Thompson, Ontario, and Glenn H. Joseph, Corona, Calif. to California Fruit Growers Exchange, Los Angeles, Calif. No. 2,059,541. Nov. 3, 1936.

Nuts in Shell Treated With Sulphur Dioxide Under Pressure and Subsequently Subjected to Ultra-Violet Rays—William George Gow, Belleville, N. J. to Charles Mauro, New York, N. Y. No. 2,059,787. Nov. 3, 1936.

Fruit Juices Preheated in Absence of Air Under Pressure to Obtain Sterility Without Thermo-Chemical Change and Then Quickly Cooled by Application of Low Vacuum—George Grindrod, Oconomowoc, Wis. to Grinrod Process Corp., Dover, Del. Nos. 2,059,788 and 2,059,789. Nov. 3, 1936.

Citrus Fruit Beverage Concentrates With Improved Keeping Quality Made From Juice of Fruits and Citral-Free Oils of the Fruit Rinds—Guy Verley to Albert Verley, Inc., Chicago, Ill. No. 2,059,828. Nov. 3, 1936.

Bread Doughs With High Milk Content Made by Increasing Water Content, Giving Extended Mixing Treatment, and Baking at Lower Temperatures Than Doughs Without Milk—Raymond Powers, Syracuse, N. Y. to the Borden Company, New York, N. Y. No. 2,059,905. Nov. 3, 1936.

Yeast With Increased Ergosterol Content, Produced by Growing in Presence of Non-Toxic Oxidizing Agent in Nutrient Mediums, Low in Assimilable Nitrogen—William Gordon Bennett, Epsom, England to Standard Brands, Inc. New York, N. Y. No. 2,059,980. Nov. 3, 1936.

Sausages Kept From Wrinkling by Use of Edible, Water-Absorbent, Vegetable Gum Filler—Hugh E. Allen, one-half to Albert G. McCaleb, Evanston, Ill. No. 2,060,160. Nov. 10, 1936.

Fish For Canning Cooked in Chamber Maintained at Temperature and Humidity Conditions Giving a Dry Bulb Temperature of 450 Deg. F. and Wet Bulb Temperature of 135 Deg. F.—Paul D. V. Manning, Berkeley Woods; David D. Peebles, Eureka; and Alfred H. Potbury, Berkeley, Calif. No. 2,060,232. Nov. 10, 1936.

Liquids De-arated by Centrifugal Force Under Reduced Pressure—George N. Pulley, Winter Haven, Fla. to Free Use of the People of the United States. No. 2,060,242. Nov. 10, 1936.

Dry Sour-Dough Starter Made From Pure Cultured Lactic Acid Bacteria—Freeman R. Swift, Mt. Vernon, N. Y. to Standard Brands, Inc., New York, N. Y. No. 2,060,264. Nov. 10, 1936.

Gelatin-like Gel Made From Agar Agar and a Mucilaginous Extract of Psyllium Seeds—Harold B. Near and August J. Pacini, Evanston and Raymond W. Crosley, Max M. Gerth, Frank T. Breidigam and John D. Kelly, Chicago, Ill. to Libby, McNeill & Libby, Chicago, Ill. No. 2,060,336. Nov. 10, 1936.

Meat Given a Lighter, Brighter Color by Mechanical Pressure While Frozen at Temperatures Between 25 to 32 Deg. F.—Harry Henry McKee and Grover Ralph Henney, to Swift & Co., Chicago, Ill. No. 2,060,422. Nov. 10, 1936.

Frozen Meat Defrosted in Chamber in Which Temperatures and Humidities Are Increased by Steam Without Loss of Weight or Meat Juices—Harry H. McKee, Chicago and William McDonald, River Forest, Ill. to Industrial Patents Corp., Chicago, Ill. No. 2,060,423. Nov. 10, 1936.

Bubble Chewing Gum Flavored With Terpeneless Natural Essential Oils—Richard P. Dyckman, Orange, N. J. to L. A. Dreyfus Co., New York, N. Y. No. 2,060,461. Nov. 10, 1936.

Cocoa Beans Steeped in Fermentation Liquid, Aerated, and Given a Three-Stage Drying and Roasting in Continuous and Successive Steps—Alfred Laessig, Halle on the Saale, Germany. No. 2,060,581. Nov. 10, 1936.

Stabilized Shortening Made From Caustic Refined Oils and Fats and a Complement of Crude Cottonseed Oil—Roy C. Newton and Donald P. Grettie to Industrial Patents Corp., Chicago, Ill. No. 2,060,587. Nov. 10, 1936.

Dry Powdered Mix for Frozen Confections Made From Sugar, Egg Yolk, Agar, Citric Acid and Pectin—Althea Lepper, New York, N. Y. No. 2,060,679. Nov. 10, 1936.

Cooking Foods for Dry Pack in Inverted Container by Steam Under Pressure and Draining Prior to Sealing—David L. Loetscher, Flushing, N. Y. to Crown Cork & Seal Co., Inc., New York, N. Y. No. 2,060,736. Nov. 10, 1936.

Liquids Irradiated in Device Which Provides for Withdrawing of Gases and Vapors From the Top and for Collecting Irradiated Liquids at Bottom—Roy O. Henszey, Oconomowoc, Wis. to Carnation Milk Co., Milwaukee, Wis. No. 2,060,865. Nov. 17, 1936.

Eggs Preserved by Coating Shells With a Deposit of Alkaline Earth Carbonate Bonded to the Natural Shell—Faw Yap Chuck, San Francisco, Calif. No. 2,060,926. Nov. 17, 1936.

Cakes High in Sugar, Milk and Shortening Content Made With Shortening Containing 2 Per Cent of a Refined Free, Fatty Acid Having 16 or more Carbon Atoms—Verling M. Votaw and Herbert F. Coith, Wyoming, Ohio to Procter & Gamble Co., Cincinnati, Ohio. No. 2,061,121. Nov. 17, 1936.

Refined Free Fatty Acid Containing at Least 16 Carbon Atoms Added to Dry Shortening of Plastic Consistency for Cake Baking—Herbert F. Coith, and Verling M. Votaw, Wyoming, Ohio to Procter & Gamble Co., Cincinnati, Ohio. No. 2,061,122. Nov. 17, 1936.

Pectin in Particle Form Given Acid Treatment to Change Setting Time Without Destroying Gelation Properties—Glenn H. Joseph, Corona, Calif. to California Fruit Growers Exchange, Los Angeles, Calif. No. 2,061,158. Nov. 17, 1936.

Citrus Fruit Suspension With Moisture Content Reduced to Predetermined Point—William W. Cowgill, Fairfield, Conn. to Sardik, Inc., Jersey City, N. J. No. 2,061,188. Nov. 17, 1936.

Baking Powder Containing Alkaline Carbonate and Phthalic Anhydride—Harry B. Rathbun, Waterbury, Conn. No. 2,062,039. Nov. 24, 1936.

Crystalline Mono-calcium Phosphate for Leavening Agent Made by Treating Lime Base With Strong Phosphoric Acid of at Least 45 Deg. Be. Gravity Strength—William H. Knox, Jr. and Robert T. Cochran, Nashville, Ten. to Victor Chemical Works, Chicago, Ill. No. 2,062,064. Nov. 24, 1936.

Beers and Ales Treated With Activated Carbon to Remove Tastes Caused by Bacterial Action—Leo Wallerstein, New York, N. Y. No. 2,062,075. Nov. 24, 1936.

Coffee Roasted and Ground in Atmosphere of Inert Gases to Prevent Deterioration—Leo M. Rogers, New York, N. Y. No. 2,062,109. Nov. 24, 1936.

Excess Dusting Flour and Dough Particles from Dough Brake Recovered by Classified Screening—Peter A. Dubus, New Orleans, La. No. 2,062,215. Nov. 24, 1936.

Ice Cream Frozen in Elongated Bar Form Inside Tubular Bag of Paper or Similar Material Closed at One End—Almond C. Routh, Sandusky, Ohio to Girdler Corp., Louisville, Ky. No. 2,062,277. Nov. 24, 1936.

Ice Cream Frozen in a Cylindrical Solid Block Form With a Wrapper Consisting of a Plurality of Separate Sections of Sheet Material Which Permits Separation Into Individual Service Portions—Clarence W. Vogt, to Girdler Corp., Louisville, Ky. Nos. 2,062,278 and 2,062,279. Nov. 24, 1936.

Liquids Subjected to High Vacuum Preliminary to Pasteurization or Sterilization and Then Cooled While Still Under Vacuum—Walter Page, Scarsdale and Bert E. Taylor, Mt. Vernon, N. Y. to Borden Co., New York, N. Y. No. 2,062,330. Dec. 1, 1936.

Canned Liquids Moved Through Sterilizer so as To Impart a Centrifugal and Rotary Movement to Contents of Can—Walter Page, Scarsdale and Bert E. Taylor, Mt. Vernon, N. Y. to Borden Co., New York, N. Y. No. 2,062,331. Dec. 1, 1936.

The Blue Section Moves

"Mixing, Part II," will appear in FOOD INDUSTRIES in February instead of January, as previously announced. Look for it next to the back cover, in the next issue.—The Editors.